



**COMMONWEALTH OF PENNSYLVANIA  
GOVERNOR'S OFFICE OF GENERAL COUNSEL**

October 15, 2013

Mark C. Szybist, Esquire  
Staff Attorney  
Citizens for Pennsylvania's Future  
8 West Market Street, Suite 901  
Wilkes-Barre, PA 18701  
**VIA HAND PICK UP**

**RE: PennFuture v. Department of Conservation and Natural Resources  
OOR Dkt. AP 2013-0402 (Consolidated)**

Dear Mr. Szybist:

Pursuant to the September 13, 2013, Final Determination of the Office of Open Records and our ongoing discussions in this matter, enclosed please find a hard copy of the Anadarko proposed Loyalsock State Forest Development Plan ("Plan"). Your requested color copy of the Plan, which was received in our office this afternoon, contains the redactions of Anadarko's confidential proprietary information and trade secrets. Lastly, as the state offices were closed on Saturday, October 12, 2013, Sunday, October 13, 2013, and Monday, October 14, 2013, due to the Columbus Day Holiday, the response deadline was extended by default to the next business day of today, Tuesday, October 15, 2013.

If you should any additional questions, please feel free to contact me at (717) 772- 4171.

Very truly yours,

MARK C. BALDWIN  
Assistant Counsel

Enclosure:

Cc: Joshua L. Belcher, Esquire (without enclosure)





**"Loyalsock State Forest Development"**  
**Plan of Development Narrative**

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ANADARKO PETROLEUM CORPORATION  
LOYALSOCK STATE FOREST PLAN OF DEVELOPMENT

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**CONFIDENTIAL & PROPRIETARY INFORMATION OF ANADARKO PETROLEUM CORPORATION****1.0 EXECUTIVE SUMMARY**

The purpose of the Loyalsock State Forest Plan of Development is to provide detailed information regarding Anadarko's overall plans for development in the Loyalsock State Forest for DCNR review and approval. The document will review the regional geology, including the Marcellus Shale, which is currently our primary reservoir target for development in this area. A surface development plan is also provided. It is based on analysis and reconnaissance that identified locations for well pads and access roads. Additionally, the surface development plan includes a description of the planned production facilities at each well pad, the production gathering facilities, and the water infrastructure necessary to support well completion operations. The safety systems communication infrastructure needed within Loyalsock State Forest will be described as part of Anadarko's operational requirements. Also included in the Loyalsock State Forest Plan of Development is a conceptual timeline that outlines the anticipated time frame that Anadarko intends to finalize a Surface Use Agreement with DCNR as well as the timing and execution of integral operational phases related to the development of the Loyalsock State Forest position. A State Forest Environmental Review was completed, and is included with this document to provide additional information on the potential impact of Anadarko's operations within the Forest. Finally, a Surface Use Agreement granting access to the Loyalsock State Forest Acreage (where Anadarko has mineral ownership) has been drafted and included along with this document for DCNR review and approval. The ultimate goal of this document and the accompanying Loyalsock State Forest Plan of Development Map is to make DCNR, including Loyalsock State Forest personnel, aware of Anadarko's plans to develop its fee mineral interests within the Loyalsock State Forest, and receive concurrence from DCNR to proceed with our plan in the most environmentally conscious way.

**2.0 Geologic Overview****2.1 General**

The Marcellus shale is an organic rich shale that extends over 550 miles through New York, Pennsylvania, Ohio, and West Virginia (Figure 2.1).

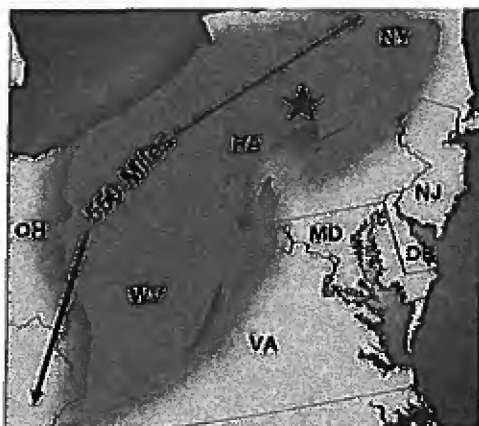
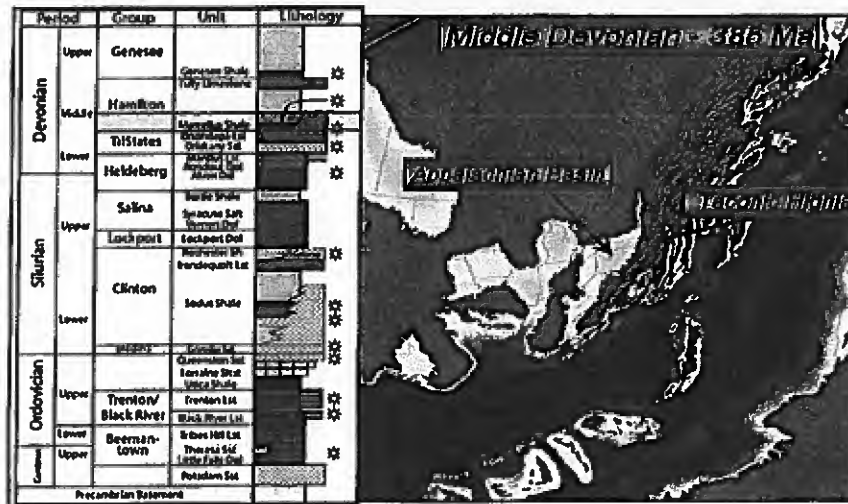


Figure 2.1 - Geographical Extent of the Marcellus Shale

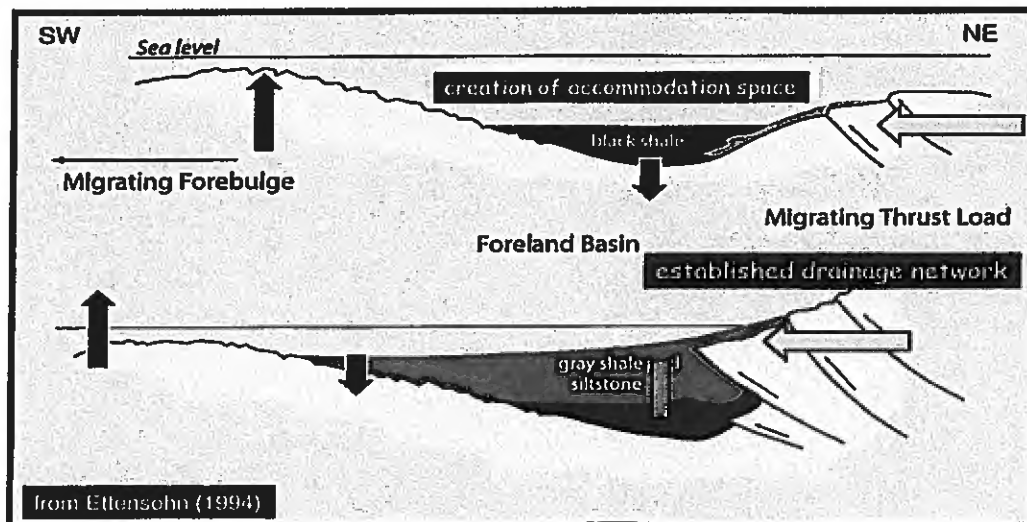
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The Marcellus was deposited in the Early to Middle Devonian in the Appalachian Basin, a subsiding foreland basin with a large Interior seaway located to the west, as the basin is currently positioned, of the Taconic highlands (Figure 2.2)



**Figure 2.2 – Marcellus Depositional Map**

During the Middle Devonian Acadian orogeny, crustal loading caused lithospheric flexure, which segmented the basin into foredeep, forebulge, and backbulge depozones and provided accommodation space in the basin (Figure 2.3).



**Figure 2.3 – Initial Formation of Marcellus Shale**

The Marcellus is the basal deepwater formation that is part of a clastic wedge of sediments, known as the Catskill Delta, shed as a result of uplift and crustal thickening of the pre-existing Taconic highlands (Figure 2.4). The sedimentation process that infilled the Appalachian Basin eventually outpaced the

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generation of accommodation space through tectonic subsidence, ultimately eliminating deepwater depositional environments, and burying the Marcellus Formation as facies generated from shallower water depositional systems prograded into the basin.



Figure 2.4 – Final Formation of the Marcellus Shale

Devonian stratigraphy is cyclical and consists of a basal black shale (e.g. Marcellus Formation) overlain by lighter gray shale, siltstone, sandstone (e.g. Hamilton Group) and a limestone at the top of the cycle (e.g. Tully Limestone) (Figure 2.5).

The basal black shale is organic-rich and is indicative of a deep, anoxic basin. Deposition of the overlying clastics indicates the end of convergence. As the lithosphere begins to rebound, the seas begin to shallow and erosion of the highlands material begins to fill the basin. The limestone unit at the top of the cycle represents a period of shallow seas where the carbonate production factory was able to establish itself as a result of a reduction of clastic sedimentation during a period of quiescence in Acadian tectonism.

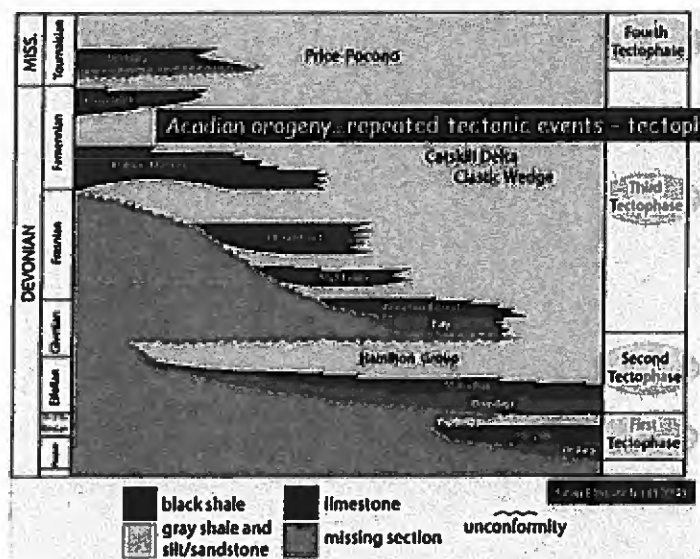


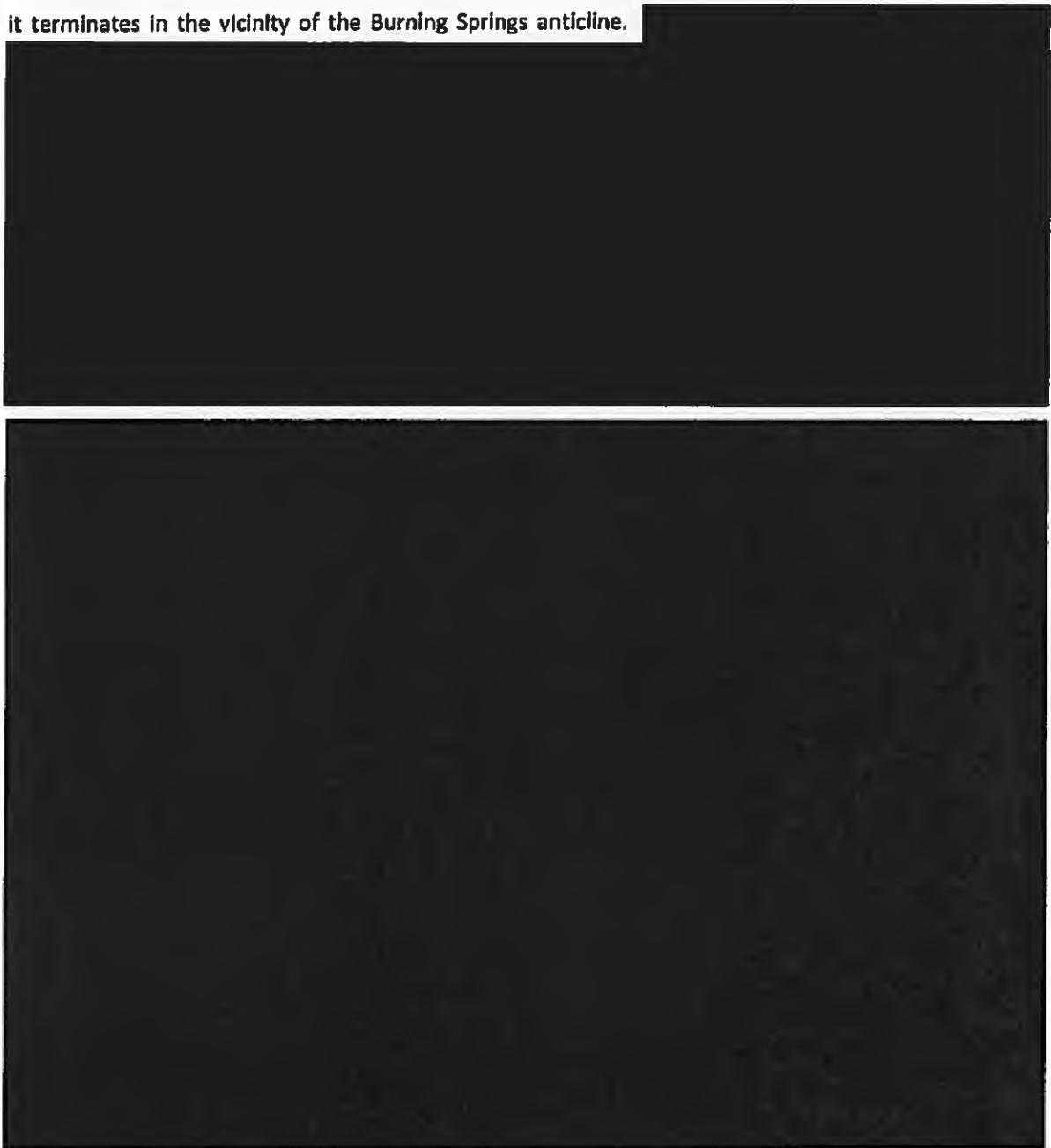
Figure 2.5 – Marcellus Stratigraphy

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## 2.2 Regional Tectonics and Structure

The Appalachian Plateau folds are an arcuate belt of anticlines and synclines northwest of, and parallel with, the Valley and Ridge structural province. The belt extends from New York to West Virginia, where it terminates in the vicinity of the Burning Springs anticline.



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## 3.0 Surface Plan of Development

## 3.1 Access Road and Pad Locations

For the proposed development of Anadarko's fee mineral interests in Loyalsock State Forest, Anadarko has performed a series of preliminary assessments of the surface conditions and associated features encompassing our acreage. This has resulted in a development plan that we believe allows for full development of the acreage, while significantly minimizing the impact to the Loyalsock State Forest.

Upon initial evaluation of the State Forest acreage, ninety-eight (98) pad locations were identified for development. However to minimize the impact to the forest, we eliminated seventy-two (72) of these potential locations, to arrive at our current plan of twenty-six (26) well pads or one-quarter (1/4<sup>th</sup>) of the original number identified. [REDACTED]

[REDACTED] To further minimize the impact to the forest, we plan to utilize horizontal directional drilling techniques to reach the majority of the subsurface from multi-well pads. A typical well pad may include six (6) wells and the necessary appurtenances. Figure 3.1 represents a well pad schematic from the Tiadaghton State Forest where twelve (12) well slots are planned to access the subsurface. We anticipate utilizing this well pad arrangement in certain areas where pad locations are limited due to terrain, or additional pad locations were removed to minimize surface disturbance.

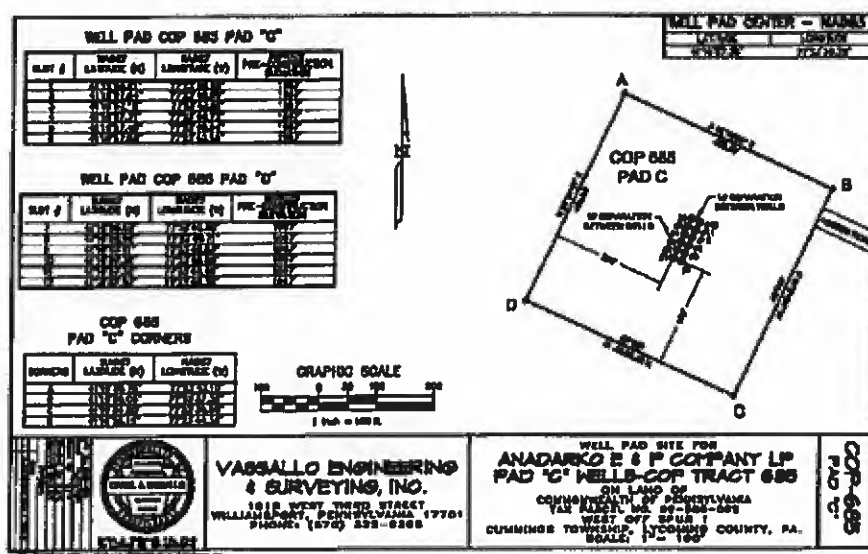


Figure 3.1 – Example of a pad layout in Tiadaghton Forest with 2 rows of slots for 12 wells

Anadarko utilizes many best practices in our road construction methodology, and we strive to set an example for building our access roads with minimal impact to the local forest. During reconnaissance, every attempt was made to stay within the existing DCNR road corridor to minimize any new disturbance to the forest. This resulted in identifying [REDACTED] of existing DCNR roads that will need to be rebuilt and upgraded to provide safe and reliable access for drilling and completion operations. Additionally, approximately [REDACTED] of new access road will need to be constructed on forest acreage.

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Anadarko plans to maintain a 35' ROW disturbance wherever possible however, the rugged terrain in this area presents some challenges that will require a wider ROW. The average anticipated ROW for permanent road access will be 40' in width.

**3.1.1 Construction Methodology**

The following information details Anadarko's standard construction methodology for access roads and well pads. For new access roads that will be constructed in Loyalsock State Forest, the first step will be the harvesting and sale of standing timber within the clearing limits of the ROW. Figure 3.2 depicts a forest area prior to timber clearing necessary for road ROW construction. Anadarko will adhere to DCNR's standard stumpage compensation policies for any commercial timber removed during this process. After timber cutting, erosion and sediment (E&S) controls will be installed as per permitted design, and stumps will be removed and stacked as per permitted design, creating a "grubbing's" pile (unless directed otherwise by DCNR). The next step will involve removing the top soil and re-using it where necessary on the road slopes to ensure proper vegetative growth is established alongside the roadways. The ground will then be leveled to grade, while installing erosion controls 'as we go' as specified in plans, or as needed for Best Management Practices. Once the ground is leveled, a Class-2 Geotextile will be laid along the full width of the road to yield a 16'-wide driving surface. Figure A.1 (see Appendix A) represents an example cross-section of the engineered road construction for 35' ROW disturbance.

To ensure road stability and to significantly reduce the need for future road maintenance, Anadarko recommends a 6"-12" thick layer of sub-base rock, typically 4"- plus or minus as required for soil stability. To add additional integrity to the roadway, the sub-base will be capped with 'clean' 2A rock. At this time the road surface will be bladed to final grade and packed for stability with a smooth drum roller. The following Figures 3.2-3.4 provide visual references on how access road construction will proceed within the forest.

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Figure 3.2– Typical Road Access ROW – Pre Construction



Figure 3.3 – Access Road Construction



Figure 3.4— Typical Access Road Post Construction

Similar construction methodology will be implemented in the construction of pad locations. The timber [REDACTED] will be cut and sold, erosion and sediment (E&S) controls will be installed as per permitted design, and the stumps will be removed and stacked as per permitted design (unless directed otherwise by DCNR). The top soil will be removed and stacked to one side of the pad per permitted design, the ground will be leveled, and a Class-2 Geotextile will be installed across the total surface area of the pad. A thicker sub base of rock will be applied (8"-12"), and clean R3 or Rip-Rap rock will be installed to stabilize the slopes of the pad, where applicable, and the pad will be capped with clean 2A rock. The pad will then be graded and packed with a smooth drum roller. Figures 3.5-3.7 provides visual examples of areas where Anadarko has constructed drill site pads in other State Forests.

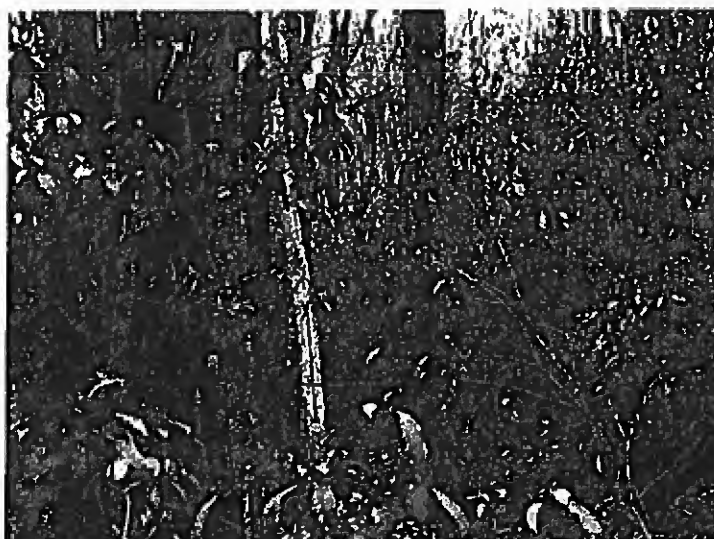


Figure 3.5— Pad Pre Construction Area



Figure 3.6 – Typical Pad Access – Pre Construction



Figure 3.7 – Pad Post Construction and Access Road

### 3.1.2 Access Road and Pad Location Overview

The following describes the access road and well pad locations which have been separated into general areas based on apparent access. The proposed pads and access roads have gone through significant preliminary review including some field assessment. These facilities have been relocated to address concerns found during review and analysis. Comments on these revisions are included as applicable. In general, tremendous thought and effort was put forth to avoid areas of forest regeneration and to utilize existing roads to the greatest extent to minimize the disturbance to the forest. Anadarko

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recognizes and appreciates the value and importance of the State Forest, and intends to develop and operate within this area with as little disruption to the forest, and its uses, as reasonably possible.

The following identified pads and roads have not been surveyed or delineated for wetlands impact. The locations identified below may be subject to change following a more in-depth review of the surface disturbance.

3.1.3 Access Road & Pad Locations on Bodine Mountain

Access via SR 14 and Bodine Mountain Road

Bodine Mt. A, B, C (formerly August 2011 1, Bodine Mtn 7, and 8 respectively) – Bodine A, B, and C were field staked and reviewed by Beran Environmental. These also have been evaluated by DCNR as captured in the letter dated October 3<sup>rd</sup>, 2011 from Mr. Teddy Borawski to Mr. Charles Beglin, Jr. In the letter from DCNR to Anadarko, DCNR requested Anadarko to limit its development in the northern area to only two (2) pads. We have revised our development plan to accommodate that request by removing the Bodine Mtn 5 location.

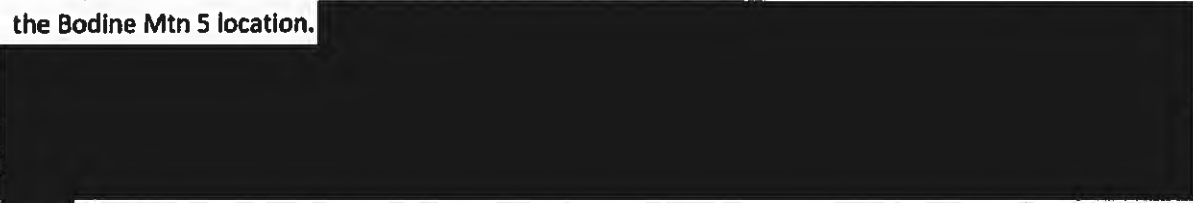


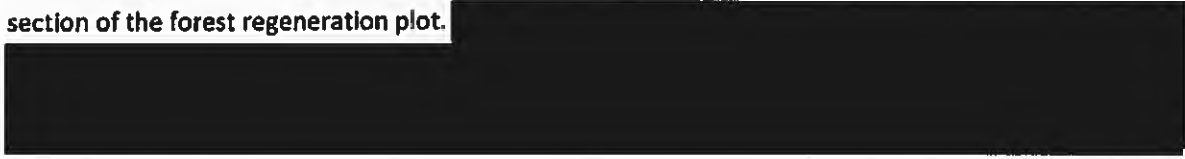
Exhibit 1, located in Appendix A, provides a more detailed representation of the surface disturbance in this area.

3.1.4 Access Road & Pad Locations South of Pleasant Creek

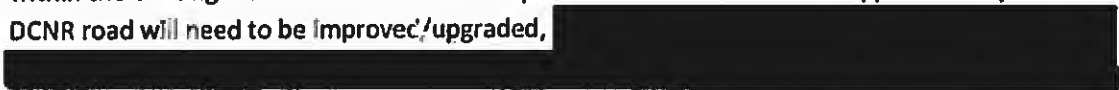
Access across PADOT Masten Bridge will be necessary. The bridge is currently out, and will need to be rebuilt to access this area. Scheduled completion is September, 2012 according to Penn DOT.

Loyalsock A, B, & C –

Not all of this area will need to be cleared for the road as the only area to be impacted is located in the southern section of the forest regeneration plot.



Loyalsock D, E, & F – These drill site pad locations are all located west of a locked gate on an existing DCNR dirt road near Sharp Top Vista. To minimize tree cutting and impact to the forest, we stayed within the existing road corridors as much as possible. To access this area approximately 0.5 miles of DCNR road will need to be improved/upgraded,



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[REDACTED]

The existing logging road will require rehabilitation to accommodate rig traffic. [REDACTED]

A more detailed schematic of the pads, roads, pipelines, and impoundments present in this area can be found in Exhibits 2 and 3, located in Appendix A.

Loyalsock G, H, & I – Loyalsock G, H, and I pads are all near maintained State Forest Roads (John Merrell Road). To minimize impact to the forest, new access roads will be constructed over relatively short distances to the G, H, and I pad sites. Both Cascade Road (1.2 miles) and John Merrell Road (2.9 miles) will require rehabilitation prior to use. [REDACTED]

[REDACTED] Exhibit 3 (Appendix A) identifies the current location in between two Forest Regeneration Areas which requires a long access road to be built.

Loyalsock J – The original pad location is no longer viable as it appeared to be located in a wet area. During evaluation, 3 alternates were analyzed. To further reduce surface occupancy, Anadarko selected one pad, the current Loyalsock J location, to develop this portion of the Fee Mineral acreage. [REDACTED]

Loyalsock K, L, M, & N – These pads are located in the eastern portion of the Loyalsock State Forest near the Lycoming / Sullivan County boundary. During reconnaissance, 6 potential pad locations were identified. Anadarko has only selected 4 pads to further alleviate disruption of the forest canopy. Directional drilling will be utilized to reach the majority of this area without the need for additional surface disturbance. [REDACTED]

[REDACTED]

Anadarko is willing to work with the Loyalsock District foresters to determine the most suitable option. [REDACTED]

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[REDACTED] The access will not need to cross Old Loggers Path.

Exhibits 3 and 4 (see Appendix A) provide more detailed information regarding this area as described the paragraphs above.

3.1.5 Access Roads & Pad Locations North of Pleasant Creek

Loyalsock O, P, & Q – The subject pads will also be accessed from Ellenton Road. [REDACTED]

[REDACTED] Therefore; Anadarko would like to work with DCNR to balance access along Krimm Road without significantly impacting use of the hiking trail.

No new road access will be necessary to access Loyalsock O. Two township roads will be impacted, and 0.7 miles of Krimm Road will require rehabilitation.

[REDACTED] The access road will also parallel a Forest Regeneration Area. A marked, unnamed trail was identified along the road, parallel to the Forest Regeneration Area. Anadarko proposes to work with the Loyalsock State Forest to develop a trail crossing or identify a method to declare this area as "multiple-use" by incorporating the road and trail into the same corridor. [REDACTED]

Loyalsock R, S, T, & U – During preliminary evaluation, 5 pad locations were identified. However, we have only selected the subject 4 well pads for development. These pads will be accessed from Ellenton Ridge Road. [REDACTED]

[REDACTED] The access to Loyalsock U will continue on from Loyalsock T. [REDACTED]

Additional detail regarding this entire development area North of Pleasant Creek can be found in Exhibit 5, located in Appendix A.

Loyalsock V and W – Both Loyalsock V and W will be accessed from SR 1013, Ellenton Mtn. Road.

[REDACTED] There is a power line servicing the cabin that will

have to be raised for clearance purposes. [REDACTED]

Pipeline information for Loyalsock V and W can be found in Exhibit 6 (see Appendix A).

### 3.2 MIDSTREAM INFRASTRUCTURE

#### 3.2.1 General Overview

This section describes the midstream infrastructure required to efficiently gather, meter, treat, and sell the natural gas produced in the Loyalsock State Forest development area. A large portion of the necessary gathering system will be connected to Anadarko Marcellus Midstream's ("AMM") Warrensville Pipeline system scheduled to be constructed in 2012. [REDACTED]

The pipeline routes and compressor locations have not been surveyed or delineated for wetlands impact. The locations and routes shown on the map or described below may be subject to change following the completion of such work and a full environmental and engineering review.

#### 3.2.2 Midstream Well Pad Facilities

Midstream equipment at the well pads will consist of a header system, metering, dehydration, and pig launchers. The header system allows each line to be used as a high or low pressure line to optimize use of the various pipelines throughout the life of the field. Metering will be by orifice meters where AMM assumes custody of the gas (from Anadarko E&P Co.). Dehydration to remove water from the gas in the high pressure system will be by either the glycol or desiccant method. Pig launchers will allow pigging operations to be performed to maintain the safety and integrity of the various pipelines. Pigging is used to clean and removing liquids from the downstream pipelines preventing corrosion and increasing flow efficiency. The well pad equipment will be monitored by AMM's electronic communication and safety monitoring systems.

#### 3.2.3 Gathering System

The design basis of the gathering system is to allow the initial installation to be of adequate capacity for the life of the field to significantly minimize future construction disturbances. The gas gathering system will be constructed of steel pipe and spooled, steel reinforced polyethylene pipe. [REDACTED]

[REDACTED] Steel reinforced poly pipe is preferred when possible because the construction installation method requires less surface disturbance.

Wherever possible, the pipeline has been routed along existing roads or the planned well pad access roads to minimize new or additional disturbance. This practice will require AMM to incur additional costs due to increased pipeline length(s) and installation cost(s). However, since the pipeline has to be contiguous there are places where the pipeline is routed cross country because no roads exist. [REDACTED]

Preliminary routing has also been done to avoid disturbing forest regeneration fences or utilize gaps between areas of re-forestation. [REDACTED]

[REDACTED] Final routing will be adjusted to minimize wetland and environmental impact.

The construction techniques employed will utilize the 35' permanent road width (or existing road width) as construction workspace for installation of the pipelines prior to constructing the permanent road or upgrading the existing road. The ROW construction width required is estimated to vary from 25' to 95' in addition to the road width. In areas where no roads will exist the required construction ROW width is estimated to be from 60' to 100'. The ROW construction width depends on a number of variables including, but not limited to, the number of pipelines, the diameter of the pipelines lines being installed, and the terrain. Multiple gas and water pipelines will be constructed in the same corridor/trenches throughout much of the ROW. [REDACTED]

Minimal, additional temporary workspace may be required for special construction operations such as stream or wetlands crossings. This will be determined based on final routing, pipeline system hydraulics and engineering design of the pipelines. All surface equipment required for the operation of the gathering system such as valves, headers, launchers, and receivers will be placed within the ROW, compressor stations, and well pads whenever possible to minimize the surface disturbance. The previously referenced Exhibits 1-6, located in Appendix A, provide a more detailed visual reference for the described gas and water pipeline right-of-way.

Construction of road and stream crossings is planned to be by open cut method rather than by hydraulic directional drilling (HDD). The risk associated with lost circulation and the release of drilling fluids to the surface, encountered in nearby areas, is too great a risk to the aesthetic and environmental values of the Loyalsock State Forest.

Below is brief discussion of the two main trunk lines involved in this development. All other gathering lines, unless mentioned above, will follow the planned access roads:

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South Trunkline -



Tie over Trunkline -



#### 3.2.4 Compression



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### **3.3 WATER INFRASTRUCTURE**

#### **3.3.1 General Overview**

This section presents preliminary details of planned fresh water infrastructure facilities that will be constructed as a part of the full field development of the Loyalsock State Forest acreage. It only covers permanently installed facilities including:

- Earthen Impoundments for storage of fresh water only;
- High and low pressure pipelines to transport fresh water only between impoundments and to well pads to support hydraulic fracture operations.

Other water facilities planned for this acreage, such as transfer pumps at the impoundments, surface installed low pressure transfer pipelines and other forms of storage (such as frac tanks and above ground lined storage ponds), would be temporary installations utilizing existing disturbances (i.e., well pads, log landings) and would not lead to any permanent surface disturbance.

#### **3.3.2 Impoundments**

A total of five earthen impoundments are envisioned for this area as indicated on the overall development map. [REDACTED]

[REDACTED] The actual number of impoundments will be optimized during the development phase with the intent of possibly reducing the total number by 30%.

#### **Design Criteria**

[REDACTED]  
[REDACTED] It should be noted that the dimensions of each impoundment and the suitability of the proposed locations can only be determined after soils boring, site survey and wetland delineation work has been completed.

The impoundment design will comply with the requirements of the Commonwealth of Pennsylvania DEP Publication 5500-PM-OG0085, "Design, Construction and Maintenance Standards for Dam Embankments Associated with Impoundments for Oil and Gas Wells". Specifically as a best practice Anadarko will use a 60 mil thick HDPE liner (instead of 40 mil) with an electrical conductive layer (to allow leak testing) and an under liner drainage system. In addition the design of the impoundments will be such that it will not be necessary to import any top soil to the site.



**Figure 3.8 – Impoundment Liner Installation**

The Impoundments will be designed to allow filling either by road truck or by pipeline and for withdrawal by temporary pumps to low pressure transfer pipelines. Each Impoundment will be provided with remote level monitoring capability and conductivity meters on the truck filling stations to ensure only fresh water is off-loaded to the impoundments.

Each impoundment site will be provided with a perimeter security fence that complies with DCNR requirements to prevent deer and other wildlife from entering the impoundment.

#### **Construction Methodology**

Impoundments will typically be constructed during late spring through late autumn, avoiding winter and the early spring months, since embankment soil compaction is not allowed by the PADEP with frozen ground conditions and liner installation cannot be carried out with ambient temperatures at or below 35°F.

After clearing and grubbing of the site, access road construction will be carried out followed by excavation and embankment construction to create the earthen impoundment. Final grading, under-drain pipework and liner installation is then carried out.

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Figure 3.9 – Impoundment Construction Phase

Finally, inlet and withdrawal piping installation including aeration pipework, security fencing installation and site clean-up work completes all construction activities.

#### Reclamation

Upon final development and commencement of production from all wells in this area, Anadarko will then undertake reclamation work for all impoundment sites, subject to mutual agreement with DCNR in the event that DCNR wishes to utilize one or more of the impoundments for fire-fighting or ecological purposes within the State Forest.

#### 3.3.3 High and Lower Pressure Pipelines



[REDACTED]

This pipeline will be installed in the same ROW as that for the main gas gathering trunkline, but in a separate trench. From the gas line ROW to the impoundments the line will be installed next to or underneath the access road to each impoundment.

[REDACTED]

### **3.4 SAFETY SYSTEM COMMUNICATION INFRASTRUCTURE**

#### **3.4.1 General Overview**

This portion of the Loyalsock State Forest Plan of Development details Anadarko's operations requiring the installation of safety system communication infrastructure in the Loyalsock State Forest acreage. A critical element to operating the assets safely is the need for a reliable communications infrastructure which allows remote monitoring of assets, provides dispatch of personnel, reduces vehicle traffic into the area, alerts the potential of safety problems, and enables security incidents to be identified and addressed. The lack of communication systems can have an adverse effect on public safety and the environment. In a letter dated July 7<sup>th</sup>, 2011 from Christopher Plank, Chief, Division of Operations and Recreation of the DCNR to Mr. Greg Bordelon, Senior ITS Administrator at Anadarko Petroleum Corporation, written approval was granted for Anadarko to begin asset antenna structure installation. This Plan assumes that the letter and its approval is applicable to this area of the State Forest.

#### **3.4.2 Description of Communication Infrastructure**

[REDACTED] Each of these development locations will require various safety system antennas to ensure communication within Loyalsock Forest is possible. Detail regarding these safety systems is described below.

[REDACTED]

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[REDACTED] These can also be  
utilized by other operators in the area for effective safety communication.



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#### 4.0 CONCEPTUAL DEVELOPMENT TIMELINE

Time	Present Fee Mineral Development Plan to DCNR	Stake/Delineate Road/Pads/Pipeline Routes in Loyalock Forest	Receive Surface Use Agreement Approval from DCNR	Pipeline Construction	Road /Pad/ Impoundment Construction	Active Development Phase	First Production from Area
01-2012							
02-2012							
03-2012							
04-2012							
05-2012							
06-2012							
07-2012							
08-2012							
09-2012							
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## 5.0 - APPENDIX A

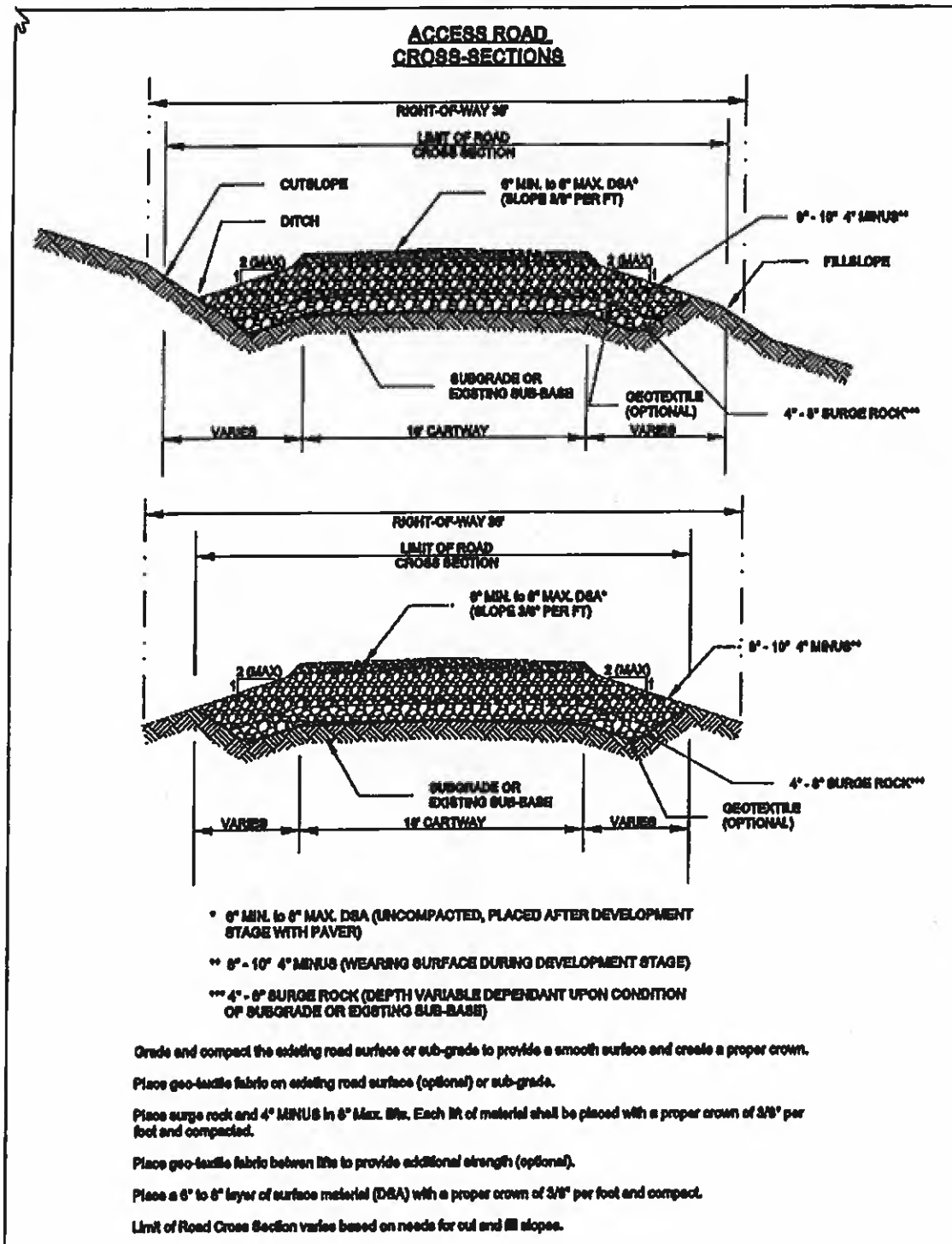


Figure A.1 - Cross section of road construction in 2 different topographic environments

March 26<sup>th</sup>, 2012

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March 26<sup>th</sup>, 2012

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## **"Loyalsock State Forest Development"**

### **State Forest Environmental Review**

## LOYALSOCK STATE FOREST DEVELOPMENT

### STATE FOREST ENVIRONMENTAL REVIEW

#### PURPOSE

The purpose of this review is to describe Anadarko Petroleum Corporation's, acting through Anadarko E&P Company LP and Anadarko Marcellus Midstream, L.L.C. (herein referred to as Anadarko), planned development activities for portions of the Loyalsock State Forest herein referred to as "Loyalsock State Forest Development" (LSFD). The project review criteria include a description of the project, the proposed development area, project assessment related to a number of ecological, operational and stakeholder considerations as well as any actions necessary to ensure that Anadarko's planned development upholds those guiding principles implemented by DCNR's Bureau of Forestry (Bureau) to sustainably manage the State Forest and its ecosystems.

Although not specifically referenced in the State Forest Environmental Review (SFER) guidance criteria available via the Bureau's website, Anadarko has prepared the SFER in an attempt to meet or exceed expectations of the Bureau while identifying any potential impacts to, disturbances of, or temporary changes in existing land use and cover to the Loyalsock State Forest. Anadarko has expended tremendous effort and resources to properly and adequately review and assess any impacts resulting from its planned development activities. It has been determined, based on the preliminary results of this SFER, that this portion of the Loyalsock State Forest is suitable for natural resource development. These activities are consistent with neighboring parcels/tracts wherein the Commonwealth owns the subsurface oil and gas rights and DCNR leased to other operators in September 2008.

#### BACKGROUND

Exploration and development of oil and natural gas resources has been ongoing in Pennsylvania for more than 150 years. DCNR has been actively engaged in natural gas exploration and production for more than 63 years on State Forest land. Several key management documents reference natural gas development as an acceptable utilization of the "resources, uses, and values of the State Forest". Since 1947, DCNR has successfully leased State Forest land through 74 competitive, public lease sales. Additionally, DCNR has entered into several sole-source lease agreements (non-competitive, private transactions) most notably in May 2010.

There are approximately 300,000 acres of State Forest land where DCNR does not own the subsurface oil and gas rights. A majority of the acreage where DCNR owns only the surface lies in the northern tier. Large, contiguous blocks of State Forest land where the subsurface rights have been severed can be found in Cameron, Clearfield, Elk, Lycoming, Potter, and Sullivan Counties. Pursuant to the State Forest Resource Management Plan (SFRMP) of 2007, the Bureau strives to increase "influence over oil, gas and mineral operations where the Commonwealth does not own the fee oil, gas, coal and hard mineral rights." The primary objective of this goal is to "protect and manage the forest resources

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according to the Bureau's best management practices" through the utilization of a Surface Use Agreement whenever possible.

Anadarko has been active in the Appalachian Basin, specifically Pennsylvania, since 2006 when it began actively acquiring acreage via lease and purchase. Since drilling its first well in mid- to late-2008, Anadarko has drilled approximately 200 wells in Centre, Clinton, and Lycoming Counties (PA). Each well has targeted the Middle-Devonian Marcellus Shale (Marcellus). The Marcellus is the basal member of the Hamilton Group overlying the Onondaga Limestone. As a reservoir, the Marcellus is known to contain large quantities of technically recoverable natural gas. In the northern tier, the gas produced from the Marcellus is "dry gas" that requires very little processing before being sold into the transmission systems. Although Anadarko's efforts to date have focused strictly on the Marcellus, there are other strata that may hold promise for future development including, but not limited to, the Genesee Shale, Oriskany Sandstone, Utica Shale, and the Trenton-Black River carbonates.

Anadarko plans to begin development on the LSFD acreage within the next year. Discussions between Anadarko and DCNR regarding this acreage first occurred in 2006. Since that time, several concerted efforts have been made to identify a mutually agreeable strategy. This SFER, Development Plan and corresponding Surface Use Agreement will provide a series of measurable expectations and guide the manner in which development will occur.

**PROJECT OVERVIEW**

The LSFD encompass approximately 25,000 acres of the Loyalsock State Forest.

These facilities represent the minimum number of facilities required to sustainably develop the natural gas contained within the Marcellus. As a result, only a small percentage of the total acreage will be utilized for development.

Anadarko's facilities have been designed to the minimum acceptable size to reduce disturbance to the forest canopy to the fullest extent possible. When compared to the industry at large, Anadarko's facilities are some of the most compact facilities in the Commonwealth.

Following the conclusion of drilling, each well will be stimulated by hydraulic fracturing in an effort to improve the efficiency at which gas is produced from the reservoir. Once completion operations are completed, each well will be equipped with a wellhead and hooked up to a pipeline. Each individual well may produce gas for thirty years or more.

**CONFIDENTIAL & PROPRIETARY INFORMATION OF ANADARKO PETROLEUM CORPORATION****ENVIRONMENTAL SAFEGUARDS**

Anadarko employs numerous operational practices and protocols to proactively manage potential environmental impacts associated with natural gas development. Beginning with the siting of the first facility, Anadarko strives to avoid and appropriately buffer all environmentally sensitive areas. Through a combination of performing digital assessments (e.g., PA Natural Diversity Index), field delineations for sensitive habitats (i.e., wetlands) and proactive construction monitoring (i.e., employing E&S Inspectors, rattlesnake monitors, etc.), Anadarko is able to identify those instances where alternative methods or locations are required. More importantly, Anadarko believes in avoiding a sensitive area in lieu of mitigation. In those instances where avoidance is not attainable, Anadarko will provide mitigation in a manner that is coincident to the wishes of DCNR as well as the appropriate jurisdictional agency.

Additional environmental safeguards are found embedded within our operational protocols. Specific procedures have been incorporated in Anadarko's operations to ensure that the environment is protected from impacts associated with natural gas development. For example, the following programs are required by all Anadarko personnel, contractors, and other representatives:

- Eyes On – fluid transfer program that requires a supervisor to watch the transfers occur
- Rattlesnake Awareness Training – discussion and training on how to avoid impacting the timber rattlesnake and what to do if one is encountered
- Bear Awareness Training – discussion and training on how to avoid human-bear interaction and what to do if one is encountered
- Spill Training and Awareness – how to avoid spills and what to do if one occurs
- Safeland USA – industry "best practice" training and awareness course to promote awareness and a safe working environment
- Review of Environmentally Sensitive Areas prior to commencing operations – promote environmental stewardship

Anadarko's development activities are subject to oversight by and compliance with the regulations of several agencies within Pennsylvania. Most notably, natural gas development activities are required to meet the stringent requirements of the PA Department of Environmental Protection. Anadarko employs best management practices that frequently require operations to adhere to requirements above and beyond what is contained within the applicable regulations.

**PROJECT AREA DESCRIPTION**

Anadarko has planned development activities in a portion of the Loyalsock State Forest encompassing approximately 25,000 acres. More specifically, the development area consists of the following:



**PROJECT REVIEW ITEMS:**

**1. Consistency with State Forest Resource Management Plan**

The Bureau has a clear, concise Mission Statement that defines how it will manage the State Forest system. The Bureau will accomplish its mission by "managing State Forests under sound ecosystem management, to retain their wild character and maintain biological diversity while providing pure water, emphasizing opportunities for dispersed recreation, habitats for forest plants and animals, sustained yields of quality timber, and environmentally sound utilization of mineral resources".

Additional guidance on natural gas development can be found within the "Geology/Minerals" section of the SFRMP. The current policy statement reads: Geology is a critical component of State Forest management. The mineral resources associated with State Forest lands will be managed for the long-term good of the citizens of the Commonwealth of Pennsylvania. All exploration, development, and utilization will incorporate environmentally and financially sound methods."

DCNR openly acknowledges that it does not own the subsurface oil, gas and mineral rights beneath a portion of the State Forest system. The subsurface estate is long considered to be the dominant estate in Pennsylvania and, therefore, the subsurface owner can make reasonable use of the surface for enjoyment of it's subsurface property. Anadarko is willing to enter into a mutually agreeable bonded Surface Use Agreement covering the LSFD lands. This is consistent with Goal #3 contained within the "Geology/Minerals" section of the SFRMP.

Therefore, by virtue of the guiding principles described above, Anadarko's planned development of the LSFD is consistent with the SFRMP.

**2. Erosion and Sedimentation**

Anadarko's development activities will result in surface disturbances due to certain necessary construction activities for facility development. These facilities include: well pad construction, access road construction, pipeline and compressor construction, water impoundment construction and other activities relating to natural gas development. Erosion and sedimentation resulting from earth disturbance activities could potentially impact adjacent forests, streams or wetlands. The potential for erosion and sedimentation to occur depends upon a number of somewhat independent variables. Most commonly,

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large precipitation events are most likely to overwhelm erosion and sedimentation controls due to frequency, duration and/or volume. Other variables include topography, soil type and structure, and miscellaneous site conditions.

Anadarko is required to develop and implement erosion and sedimentation control plans that meet or exceed the requirements in Chapter 102 as administered by PA-DEP. These plans are reviewed prior to permit issuance by PA-DEP staff for consistency and functionality within the permitted disturbance. The most common permits dealing with erosion and sedimentation that Anadarko must obtain prior to construction include the following:

- "Erosion and Sedimentation Control General Permit-1 (et seq.)" (Chapter 102) - *earth disturbances associated with well pads, access roads, pipelines, etc.*
- General Permits (Chapter 105) – *stream crossings and wetlands associated with access roads, pipelines, and water intakes; subject to certain threshold criteria*
- Joint Permits (Chapter 105) – *stream crossings and wetland encroachments associated with access roads and pipelines in EV waters, and water intakes in HQ and EV waters; subject to certain threshold criteria*
- National Pollutant Discharge Elimination System permits (Chapters 92 & 102) – *construction of new public access roads, subject to certain criteria*

Any soil erosion and sedimentation that may occur due to surface disturbance will be controlled and managed in a manner consistent with those plans required under the above permits. Additionally, Anadarko and its contractors are required to meet the requirements of regulations not specifically referenced herein. The following regulations reference erosion and sedimentation requirements within and include, but are not limited to:

- Federal Clean Water Act
- Pennsylvania Clean Streams Law (Chapter 91)
- Oil and Gas Act (Act 223)
- Oil and Gas Conservation Law (Act 359)
- Coal and Gas Resource Coordination Act (Act 214)
- Solid Waste Management Act (Act 97)

It is expected that any issues arising as a result of erosion and sedimentation will be extremely limited. No permanent erosion and sedimentation issues are anticipated from Anadarko's development activities.

### **3. Surface Water Quality**

Potential impacts to surface water quality are possible through three (3) main categories – impacts associated sedimentation, impacts associated with thermal increases,

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and impacts resulting from pollution events. The potential to realize surface water impacts due to extreme sedimentation are described above. Sedimentation to surface water bodies can be avoided by constructing and maintaining proper erosion and sedimentation controls. Anadarko's practices are consistent with Commonwealth law as well as those provisions contained within DCNR's oil and gas lease agreement.

Minor increases in surface water temperatures (thermal degradation) can be caused due to the removal of riparian vegetation. Anadarko will avoid removing riparian vegetation wherever possible. Furthermore, for this development Anadarko will incorporate the Bureau's standard buffer distances as described in the Aquatic Buffer Guidelines (effective January 1, 2007) where feasible. In those instances where deviation from these guidelines is required, Anadarko will coordinate with the Bureau to determine a suitable solution. There will be a need to clear streamside vegetation due to pipeline crossings in certain instances. Anadarko will replant all temporary workspace using a plantings plan approved by the Bureau.

A remote possibility exists that surface water quality could be subject to pollution by chemical means. Fluids commonly used during facility development could impact surface waters if they were allowed to escape. These occurrences are rare and are generally associated with accidental releases. Anadarko has implemented a series of protocols and procedures to significantly reduce the chances of spilled fluids from entering a waterway. The following items aid in eliminating impacts from spills:

- "Eyes-On" fluid transfer program (described above)
- DEP-required Preparedness, Prevention and Contingency Plan
- Spill Prevention Control and Countermeasure Policy
- Installation of impervious containment liners on well pads
- Installation of secondary containment devices such as dikes and impoundments
- On-site vacuum trucks
- Spill Response trailer equipped with spill response materials
- Continuous training and education of all Anadarko personnel and contractors
- Spill drills

Any substance that has the potential to impact surface waters, such as chemicals, flow-back water, production water and other fluids, are stored in manner that will allow for immediate containment of the substance in the event that a spill occurs. Anadarko stores only freshwater in open pits; flowback or production water is stored in sealed, metal tanks. These practices meet or exceed Pennsylvania regulations and are in accordance with industry best management practices.

Anadarko does not anticipate impacts to surface water quality as a result of its planned development activities.

#### 4. Air Quality

Temporary increases in emissions are expected during development activities due to the use of internal combustion engines. Typical fuel sources used during development include gasoline, diesel fuel and/or natural gas. Those emissions that are expected to increase due to operations include:

- carbon monoxide
- nitrogen oxide
- sulfur dioxide

These emissions are covered by the Air Pollution Control Act (P.L. 2119, 35 P.S. 4001, et seq.) and do not impose any long-term or permanent impacts to air quality. Additionally, the short-term generation of dust, smoke, and particulate matter may occur as a result of trucking or the use of complex machinery to build well, pipeline or water facilities.

Natural gas processing units, dehydration units and compressor stations will be another source of air emissions. Anadarko employs emission controls to limit those emissions released to the atmosphere from these facilities. In most instances, these facilities utilize cleaner burning natural gas, in lieu of diesel or fuel oil, for fuel gas. Anadarko permits these facilities through PA-DEP as required by Chapter 135. Additionally, Anadarko has been working with the Federal Environmental Protection System (EPA) regarding "nationwide assessments" of its air emissions. Furthermore, Anadarko has been a member of the EPA's Natural Gas STAR program since 1996 (<http://www.epa.gov/gasstar/>).

No long-term, permanent impacts to air quality are anticipated as a result of Anadarko's planned development.

#### 5. Water Quantity

Water use for the natural gas industry within the Susquehanna River basin is governed by PA-DEP (via Act 220) and the Susquehanna River Basin Commission (SRBC, via the Susquehanna River Basin Compact). Those members of the natural gas industry that are targeting "unconventional reservoir" (e.g., shale gas development) are regulated from gallon one. That is, any operator that uses water for shale gas development within the Susquehanna River basin must receive explicit approval to consumptively use this water prior to its use. As such, every drop of water used in Anadarko's development will be subject to the scrutiny and regulations of the SRBC and PA-DEP.

The SRBC requires that certain environmental assessments are performed prior to approving a water source. These assessments must demonstrate that the water source (i.e., surface or groundwater) will not adversely impact aquatic biota, hydrologic conditions or a downstream use. Additionally, an operator must demonstrate that it has legal access to

withdraw this water prior to the SRBC rendering its approval. Typically, legal access is demonstrated via a surface access agreement that has been memorialized between the applicable parties. Anadarko's approved water sources can be found on the SRBC website by visiting this address - <http://srbc.net/wrp/Search.aspx>



Recycling practices have allowed Anadarko to reduce its need for freshwater across its entire operating area.

No impact on water quantity is anticipated as a result of Anadarko's planned development.

## 6. Groundwater

Protecting Pennsylvania's groundwater is achieved through the implementation of certain practices described above in Item 3 – Surface Water Quality. The use of containment (i.e., impervious lines, secondary diking, etc.) to retain any fluids and prevents them from infiltrating into shallow aquifers. Pre-drill water sampling of private water supply wells helps characterize groundwater conditions prior to the commencement of operations. Please note, it is not uncommon to encounter methane in the subsurface aquifers prior to drilling.

Chapter 78 Subchapter D sets forth the regulatory requirements for the protection of groundwater resources. More specifically, Chapter 78 describes the minimum casing and cementing requirements for oil and gas well development. All of Anadarko's natural gas wells are constructed to protect groundwater. Particular attention has been given to identifying the deepest fresh groundwater using petrophysical analysis.

Anadarko does not intend to utilize groundwater sources within the Loyalsock State Forest for the purposes of natural gas well development at this time. No impacts to groundwater are anticipated as a result of Anadarko's planned development.

## 7. Soils

Soil compaction from heavy equipment could adversely impact soils located in the disturbance area. Impacts of this type can be reduced or eliminated by proper soil management including pre-construction soil analyses to determine baseline soil conditions and/or the ordered striping and stockpiling of native soils to segregate topsoils from other soils or soil types. Proper preparation of the disturbed areas prior to reclamation can help promote the vegetative growth. Procedures such as scarification and soil amendments to reestablish drainage and add important nutrients are employed as best management practices. Anadarko will follow the guidance of the Bureau when restoring topsoil.

The predominant soils in the LSFD can be characterized and described as follows (U.S. Department of Agriculture, 1986 and 2004):

- OxD - Oquaga and Lordstown very stony loams, 8-25% slopes
  - 65% Oquaga soils, 20% Lordstown soils, 15% others (including Wellsboro & Dekalb soils)
  - soils typically found on ridges crests, mountaintops and topographic benches
  - moderate permeability, low available water capacity
  - trend towards acidic soils in the absence of limestone
  - moderately high productivity for trees
- OxE – Oquaga and Lordstown very stony loams, 25-70% slopes
  - 60% Oquaga soils, 30% Lordstown soils, 10% others (including Dekalb, Leck Kill, Lackawana, and Klinesville soils)
  - soils typically found on mountainsides
  - moderate permeability, low available water capacity
  - trend toward acidic soils in the absence of limestone
  - moderately high productivity for trees

No permanent impacts to soils are anticipated as a result of Anadarko's planned development.

#### 8. Unique and Unusual Geologic Features

There are no known unique or unusual surficial geologic features contained within this area. Please note – these features will be identified via PNDi; these areas will be avoided to the extent possible.

No permanent impacts to unique or unusual geologic features are anticipated as a result of Anadarko's planned development.

#### 9. Aesthetics

Surface disturbance will not occur within the boundary of any designated Wild or Natural Area. These areas are considered to be of the utmost aesthetic beauty. Aesthetic buffers will be maintained to preserve the boundaries of these features.

Facility development – i.e., well pads, access roads, pipelines, water impoundments – may impact a local viewshed by the removal of forest canopy. These impacts will be visible to the naked eye depending on a number of natural variables that include topography/terrain, season, canopy height, and proximity of the facility to an observation point. It is anticipated that large portions of existing viewsheds in this area will remain unchanged. The Loyalsock State Forest has been and will continue to be actively managed for its timber resources. The visual impacts resulting from natural gas development are very similar to those attributable to

forest management. Facilities can be constructed in a manner that reduces aesthetic impacts in a regional area; input from the Bureau is appreciated. Aesthetic buffer guidelines will be followed whenever possible.

Impacts from the aesthetic values of the Loyalsock State Forest will be limited and temporary. No permanent aesthetic impacts are anticipated as a result of Anadarko's planned development.

#### **10. Noise and Light Levels**

There will be temporary impacts in noise levels as a result of facility construction and development. Temporary increases in noise levels due to construction machinery, drilling rigs, completion operations and pipeline installation can be expected. An overwhelming majority of the increases in noise level will be during day-light hours. Additionally, these "noise centers" will shift as the activities shift. Several variables factor into how the noise increases are heard including the following: topography, weather/seasonality, native vegetation, and the generating source. Compressor stations will be required to meet the Lycoming County noise standards as described in the applicable noise ordinance (50 dB at the station's property line).

Temporary impacts as a result of safety lighting should be expected during periods of drilling and completion operations. Light sources are typically mobile, diesel powered "light plants" as well as those lights that are incorporated in the drilling rig and can be seen illuminating the rig derrick at night. Impacts to the sky will be temporary. Very few, if any, well flares will be necessary due to the construction and implementation of the pipeline network.

Noise and light impacts will be temporary and short-lived. No permanent impacts are anticipated from Anadarko's planned development.

#### **11. Archeological Sites and Historic Sites**

Anadarko's facilities will be sited away from stream bottoms and river valleys wherever possible. Given the drastic change in elevation in this area, most native cultures did not establish settlements on the ridge tops. Archeological review will be performed prior to facility development when appropriate. Anadarko will coordinate with the Pennsylvania Historic and Museum Commission as necessary.


No impacts (temporary or permanent) to archeological sites or historic sites are anticipated as a result of Anadarko's planned development.

#### **12. Recreation Sites and Opportunities**

Temporary increases in noise levels as well as certain perceived aesthetic impacts could adversely impact State Forest-based recreation and recreational experiences. Adverse impacts will vary with the Forest use and the individual(s) seeking a particular experience. Temporary road closures may be implemented during facility construction.

These closures will be promulgated by the Loyalsock State Forest working in conjunction with Anadarko. Closures may be necessary to eliminate the opportunity for conflicts with the general public.

Although facilities such as well pads and compressor stations will remain "off-limits" to the general public, the Loyalsock State Forest will remain open to the public throughout the course of Anadarko's development. Anadarko will have 24-hour security on location during all active operations (i.e., drilling, completions, flowback, etc). Security is used to protect the general public from potentially risky situations as well as to monitor and track access into and out of the facilities by Anadarko personnel and contractors.



Trail buffers will be adhered to whenever possible. As described above, there may be the need to encroach upon the traditional trail buffers. Anadarko will coordinate with the Bureau to determine what alternatives may exist – i.e., trail relocation, improvement or development.

No impacts to recreation sites or opportunities are anticipated as a result of Anadarko's planned development.

### **13. Public Health and Safety**

Access to natural gas facilities will be restricted during operations in an effort to protect and preserve public health and safety. Twenty-four (24) hour security will be provided by Anadarko while operations are on-going. Once a well pad begins producing, the public will be restricted from those areas associated with production such as the wellhead, dehydration and gas processing units, meter buildings and production tanks.

Anadarko's operations are subject to regulation by the Occupational Health and Safety Administration within the U.S. Department of Labor. Additional health and safety oversight is provided by the several State agencies including PA Department of Labor & Industry, PennDOT, and PA-DEP. All facilities will be identified in several emergency management databases via Lycoming County's 911 addressing program.

No impacts are anticipated as a result of Anadarko's planned development.

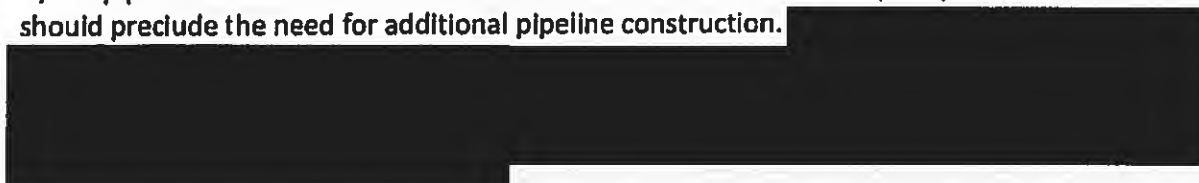
#### 14. Transportation & Pipelines

Anadarko plans to invest in the road improvements, rehabilitation and construction project within the LSFD. Existing facilities may require significant rehabilitation to withstand the construction and development traffic. Other facilities may only require minor maintenance (i.e., top dressing or grading) due to recent road improvements. Regardless of the improvements necessary for access, all costs associated with road projects will be incurred by Anadarko. During active operations including routine production operations, all road maintenance will be performed by Anadarko at no cost to the Bureau. The following details the anticipated road projects:



Truck traffic will significantly increase during active operations. Steps will be taken to eliminate potential conflicts with non-commercial vehicles. Traffic control protocols may be incorporated to reduce the potential for vehicle accidents. For example, temporary road closures, implementation of road flaggers, and/or dedicated one-way trucking routes could be used where possible. Signage will be posted where appropriate and Anadarko representatives will have a dedicated hauling route to use during development activities. Restrictions due to weather or "traditional" forest uses may be implemented when necessary.

Anadarko has designed its natural gas pipeline system for the life of the LSFD field. That is, the pipelines that will be installed have been sized for maximum capacity and, therefore, should preclude the need for additional pipeline construction.



Typically, all

pipelines will be installed immediately adjacent to the access roads. This practice is more environmentally palatable as to minimize the need to create a new transportation corridor through the forest. Please note, this practice can complicate construction and maintenance operations and requires a larger capital investment due to increases in pipeline length. Details are as follows:



*(note: actual right-of-way disturbance is discussed in Section 16 below)*

Anadarko will seek to develop a water distribution system within the same trenches and ROW required for the gas pipeline system. This should not result in additional surface disturbance for ROW. Construction and operation of the water distribution system, including centralized freshwater impoundments, will allow for a significant reduction in the number of water trucks needed to transport water for operations. This practice not only increases safety but also leads to a reduction in emissions, fuel consumption, and maintenance activities.

#### 15. Energy Needs/Use

Consumption – machinery, equipment and vehicles used to access, construction and develop facilities will require the use of gasoline and diesel fuel. Fuel consumption (volume) is unknown and is subject to a number of variables.

Generation of Fuel Source – Anadarko's planned development activities have the potential to extract a substantial volume of domestic fuel. Conservative estimates show that the LSFD could generate billions of cubic feet of new natural gas reserves. This volume provides an important energy source for millions of residences and businesses within the northeastern United States.

#### 16. Existing/Potential Land Use

Following the acquisition of these lands by the Commonwealth in 1933, they were immediately included into the State Forest system and are currently managed as part of the Loyalsock State Forest. This acreage is a working forest providing forest products while maintaining habitat, offering recreation opportunities and harboring watersheds. These resources are comparable to those found throughout the State Forest system.

The Bureau has segregated the State Forest system into management zones based on "land use and land use capability" for the purpose of implementing forest management practices. Those management zones within the LSFD can be characterized as follows:

- Aesthetic/Buffer Zone: *approximately 12% of the LSFD has been zoned as buffer zones due to aesthetics, connectivity and surface water quality*

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- Limited Resource Zone: *approximately 18% of the LSFD has been zoned limited use due to topographic constraints*
- Multiple Resource Zone: *approximately 61% of the LSFD has been zoned as multiple use providing for many uses including but not limited to commercial timber management and oil, gas and mineral extraction*
- Wild & Natural Areas: *approximately 4% and 1% of the LSFD has been zoned Wild or Natural Area, respectively; there will be no surface disturbance within these delineations*
- Recreational & Cultural Areas: *approximately 4% of the LSFD has been zoned as having significant recreational and/or cultural significance*

There is some variability in the forest community types found within LSFD. Analysis has demonstrated that the predominating forest community type can be described as Northern Hardwood Forest. Other communities exist however and this area could be characterized as somewhat homogeneous. The following community types were identified:

- Northern Hardwood Forest (BB) – *approximately 69% of the LSFD was typed BB, large portions of which are part of the commercial land base*
- Black Cherry – Northern Hardwood Forest (BC) – *approximately 7% of the LSFD is typed BB, a majority of which is part of the commercial land base*
- Red Maple Forest (CC) – *approximately 6% of the LSFD is typed CC, a majority of which is part of the commercial land base*
- Dry Oak – Heath Forest (AH) – *approximately 5% of the LSFD is typed AH, some of which is part of the commercial land base*
- Red Oak – Mixed Hardwood Forest (AR) – *approximately 4% of the LSFD is typed AR, a majority of which is part of the commercial land base*
- Dry Oak – Mixed Hardwood Forest (AD) – *approximately 3% of the LSFD is typed AD, little of which is part of the commercial land base*

The LSFD will continue to be managed as part of the Loyalsock State Forest during and after development. Anadarko's planned development activities will not alter the existing land use – that is, these lands will remain in the public domain, to be used and enjoyed by the public domain. Based on Anadarko's development plan, the following disturbances are anticipated:

Facility	Average Size	Count	Total Acreage
Well Pad			
Compressors			
Impoundments			
New Roads			
Pipelines (adjacent)			
Pipelines (cross-country)			
TOTAL ANTICIPATED SURFACE DISTURBANCE			

No permanent impacts are anticipated to result from Anadarko's planned development activities.

#### 17. Protected Animals and Plants

All facilities will be subject to PNDI review and clearance prior to being constructed. The jurisdictional agencies will have the opportunity to identify those animals and plants that warrant consideration above and beyond that afforded elsewhere. There is the potential that certain species may require additional screening, focused study and analysis. Anadarko has contracted with several consultants that specialize in the identification of important species and habitats. Following the conclusion of a focused study, the results are sent to the appropriate agency for review, comment and disposition. Anadarko will also provide these results to the Bureau for their review and comment.

In the event that critical habitats or species are identified, Anadarko is prepared to perform mitigation, implement avoidance measures, enhance existing habitat, or perform monitoring as appropriate. Anadarko provides education and training to its personnel and contractors in an effort to eliminate inadvertent impacts during facility construction and development.

No impacts – temporary or permanent – are anticipated as a result of Anadarko's planned development.

#### 18. Habitat Diversity and Interspersion

Facility development will aim to protect the various habitats found within the LSFD. The PNDI review tool and corresponding field visits by Bureau personnel will help to identify, protect and preserve those habitats that are integral to fostering diverse habitats. Opportunities for enhancements and improvements may exist. Anadarko is willing to work with the Bureau to offset any adverse impacts to important habitats.

**19. Biological Productivity**

Clearing of vegetation will be required for facility development. Plantings will be designed to eliminate the germination of non-native species, provide food and habitat for various animals, and establish early successional habitat for future forest types.

No permanent impacts to biological productivity are anticipated as the result of Anadarko's planned development.

**20. Vegetation**

Any vegetation that is removed from the Loyalsock State Forest will be subject to the standard stumpage rates and practices charged by the Bureau. The Bureau will mark and tally all timber to be removed pursuant to the protocols and procedures contained within the recently updated Silviculture Manual. Anadarko requests that all timber invoices be issued according to the provisions outlined by the Forest Stewardship Council (FSC) so that the chain of custody associated with sustainably managed forests is preserved. Anadarko will use SFI-certified loggers as necessary.

Anadarko's management of invasive or non-native species will be coordinated with the Loyalsock State Forest. Vegetation will be identified, monitored and eradicated where appropriate. Disturbance areas will be revegetated using the Bureau's preferred seed mixes and planting protocols. Native grasses and herbs will be utilized for ground cover and soil stabilization where possible. Application rates will be incorporated that meet or exceed Bureau standards. Where possible, plantings will be done using a hydro-seeder or similar device. Shrub plantings will be subject to Bureau review and approval. All vegetative plantings will be subject to the concurrence of the Loyalsock District Forester.

**21. Non-Native Species**

Anadarko will coordinate the identification and eradication of non-native, competing and inhibiting vegetation with the Loyalsock State Forest where appropriate. Weed-free mulch and native plantings will be incorporated during revegetation practices.

**22. Other**

*Economic Considerations*



Commonwealth Revenue – Anadarko's planned development activities will result in royalties and fees being paid to Commonwealth citizens due to well development (e.g., unitization); Anadarko personnel and associated contractors will pay personal income tax on salaries and wages earned as a result of this development; Anadarko will pay taxes, fees, and tariffs as a result of its planned development

March 26<sup>th</sup>, 2012

**CONFIDENTIAL & PROPRIETARY INFORMATION OF ANADARKO PETROLEUM CORPORATION**

Low-Cost Energy – Anadarko’s planned development will provide low-cost, domestic energy to Pennsylvania’s citizens as well as the ability to fuel the major population centers of the eastern United States

**23. Permits**

Anadarko will obtain and adhere to all necessary permits required for development. In the event DCNR/Bureau are required to be listed as “Permittee” or “Co-Permittee” (e.g., NPDES permits), Anadarko will accept the sole burden for permitting the facility.



**"Loyalsock State Forest Development"**

**SURFACE USE AGREEMENT**

**OIL AND GAS DEVELOPMENT**

M-SUA O&G

March 26th, 2012

Surface Use Agreement - Oil and Gas Development

**CONFIDENTIAL & PROPRIETARY INFORMATION OF ANADARKO PETROLEUM CORPORATION**

Commonwealth of Pennsylvania  
Department of Conservation and Natural Resources  
Mineral Section, Bureau of Forestry  
P.O. Box 8552  
Harrisburg, PA 17105-8522

**Contract No.**  
**M-600000-00**

**SURFACE USE AGREEMENT - OIL AND GAS  
DEVELOPMENT**

**THIS SURFACE USE AGREEMENT – OIL AND GAS DEVELOPMENT** (hereinafter ("Agreement")) made and entered into on this \_\_\_\_ day of \_\_\_\_\_, 2012, by and between the **COMMONWEALTH OF PENNSYLVANIA** ("**Commonwealth**"), acting through the **DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES**, hereinafter designated "**Department**" and **ANADARKO E&P COMPANY LP**, with its principal place of business at P.O. Box 1330, Houston, TX 77251-1330, and **ANADARKO MARCELLUS MIDSTREAM, L.L.C.**, with its principal place of business at P.O. Box 1330, Houston, TX 77251-1330 and authorized to do business within the Commonwealth of Pennsylvania, hereinafter collectively designated "**Operator**". **Department** and **Operator** may hereinafter be referred to individually as "**Party**" and/or collectively as "**Parties**".

**WITNESSETH:**

**WHEREAS**, the Commonwealth acquired approximately 25,621 surface acres in Lycoming and Sullivan Counties, Pennsylvania by the deed of March 28, 1933, from the Central Pennsylvania Lumber Company. This land is managed by the Department as part of the Loyalsock State Forest; and

**WHEREAS**, the Department desires to have Operator's oil and gas development activity on the Loyalsock State Forest conducted in a manner consistent with the Department's duty to protect the natural resources and public use of State Forest lands pursuant to the Conservation and Natural Resources Act (Act of June 28, 1995, P.L. 89, No. 315) and Article I, Section 27, of the Constitution of the Commonwealth of Pennsylvania, which provides:

The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and aesthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.

**NOW THEREFORE**, in consideration of the foregoing and the mutual promises contained herein, and intending to be legally bound, the Parties agree as follow:

## **1. SURFACE USE TERM**

**1.1** Department hereby grants to Operator the right and privilege of entering upon the surface of the tracts within the Loyalsock State Forest, containing approximately 25,621 acres of land in Lycoming and Sullivan Counties, Pennsylvania, (hereinafter the "Tracts"), as shown on the map attached hereto as **Exhibit "A"** and described through the warrants and legal description attached hereto as **Exhibit "B"**, solely for the purpose of finding, producing, and removing oil and gas from the Tracts in accordance with the terms and conditions set forth herein.

**1.2** Operator hereby agrees to comply with the terms and conditions of this agreement on the Tracts within the Loyalsock State Forest, containing approximately 25,621 acres of Land in Lycoming County, as also shown on the map attached hereto as **Exhibit "A"** and described through the warrants and legal description attached hereto as **Exhibit "B"**.

**1.3** This Agreement shall remain in force for ten (10) years from the date first written above (the "Effective Date"), subject to the conditions hereinafter set forth, and shall continue thereafter so long as Operator conducts oil and gas drilling and/or production operations upon the Tracts or Operator is engaged in the abandonment of these operations or removal of equipment therefrom.

**1.4** On termination of this Agreement by surrender, forfeiture, or otherwise, Operator shall have one hundred eighty (180) days after operations have ceased in which to remove all equipment and restore the Tracts to its original condition or as near to its original condition (as of the date herein), as possible. If additional time is needed, Operator must obtain written consent from Department. Should Operator fail or refuse to remove his property during the prescribed period, Department may at its option do so at Operator's expense.

## **2. SURFACE CONSIDERATION PAYMENT**

**2.1** In consideration for the right to enter upon the Tracts for oil and gas development, Operator shall pay Department the sum of **Fifteen Million Dollars (\$15,000,000.00)** ("Consideration"). This sum is payment in full for the 500 acres, more or less, of surface disturbance described in the Loyalsock State Forest Development Plan ("Plan") attached hereto as **Exhibit "G"**. Operator agrees to pay 25% of the Consideration (\$3,750,000.00) upon the execution of this Agreement; 25% of the Consideration (\$3,750,000.00) upon the commencement of construction of the facilities described in the Plan; and the remaining 50% of the Consideration (\$7,500,000.00) within 30 (thirty) days of the commencement of production from the Tracts through facilities described in the Plan.

### **3. LAWS, RULES AND REGULATIONS**

3.1 Nothing in this Agreement shall in any way be so construed as to impair the powers, privileges or duties of the Commonwealth, or its representatives, in the execution of the laws of the Commonwealth or the United States or the applicable rules and regulations promulgated thereunder, now in force or hereafter enacted or adopted.

3.2 The Operator is solely responsible for obtaining any and all local, State or Federal permits or other approvals necessary for and associated with any of the operations related to this Agreement, and shall be held liable by the Commonwealth, any agency of the Commonwealth, or any other local or Federal authority for the violation or non-compliance of any relevant laws, rules, and regulations.

3.3 Operator shall strictly adhere to all rules, regulations and requirements governing the withdrawal and use of surface and ground waters, including, but not limited to, those administered by the Department of Environmental Protection ("DEP"), the Susquehanna River Basin Commission, the Delaware River Basin Commission, and any other river basin commission, agency or authority having designated jurisdiction of the waters of the Commonwealth. In addition, Operator shall obtain consent, not to be unreasonably withheld, from the District Forester prior to using surface or ground waters located on the Tracts as a take point for fracing or any other well drilling or well development operations.

3.4 This Agreement does not constitute an estate or interest in submerged lands pursuant to Section 15 of the Dam Safety and Encroachment Act, act of November 26, 1978, P.L. 1375, No. 325, as amended, 32 P.S. § 693.15.

### **4. INDEMNITY AND HOLD HARMLESS**

4.1 Operator shall, during the term of this Agreement, indemnify and hold harmless Department from and against all detriment, damage, loss claims, demands, suits, expenses, or other claims of any kind whatsoever which Department may sustain, suffer, or be subject to directly or indirectly by reason of the location, obstruction, presence, maintenance, renewal, or removal of the operations permitted by this Agreement or resulting therefrom.

4.2 No provision of this Agreement shall be construed to be a waiver by the Department of its right to assert a defense of sovereign immunity to any claim for damages, pursuant to the authority contained in the JARA Continuation Act of 1980, Act of October 5, 1980, Public Law 693, No. 142, as amended, or any other legal authority established in the Commonwealth which permits use by the Commonwealth of a sovereign immunity defense.

### **5. LIABILITY**

5.1 Operator shall be liable and responsible for any pollution or other damage to any portion of the environment in or adjacent to the Tracts which occurs as a result or consequence of Operator's occupation and use of such Tracts, regardless of whether or not such pollution or damage is due to negligence or to the inherent nature of Operator's operations, unless an independent intervening cause is found to be the sole proximate cause of the pollution or damage. Any action for civil damages on account of such pollution brought by Department against Operator shall not bar Department from bringing other actions under the Clean Streams Law or other pertinent State or Federal laws, rules, or regulations.

## 6. ASSIGNMENTS

6.1 Operator shall not use, or allow to be used, the Tracts for any purpose other than those specifically authorized by this Agreement and shall not assign or sublet the use of the surface of the Tracts, in accordance with this Agreement, in whole or in part at any time or from time to time without the prior written consent of Department. Operator shall make application to the Department to obtain such consent in writing accompanied by a plat describing the Tracts to which the rights under this Agreement are to be assigned and the interest therein if less than the whole, together with the interest retained by assignor. Assignee shall agree in writing to be bound by all of the terms and provisions of this Agreement and shall furnish a surety or performance bond satisfactory to Department. Upon Department's consent to the assignment and assignee's assumption of all liability under this Agreement arising or accruing subsequent to the date of such assignment as to the part or parts so assigned, Operator shall be released from all such liability; and assignee shall be deemed to have assumed and be responsible for the covenants, conditions, and obligations of this agreement as to the part or parts assigned. In the event that a portion only of the Tracts is assigned, the default of any of the covenants, conditions, or obligations of this agreement by one of the holders of a portion of the Tracts created by an assignment will not affect the interests of a party not in default.

6.2 In the event that the Operator enters into a "Farmout Agreement" with a third party for the purpose of allowing a "Farmee" to explore, develop, or produce oil and gas from the Tracts, or any portion thereof, Operator shall be liable for enforcing all the provisions of this Agreement, including the posting of the required plugging sureties for each and every well drilled and operated by the Farmee. Although the Department recognizes a right of the Operator to farmout its fee oil and gas interests or portions thereof from time-to-time, Department will hold the Operator solely responsible for the enforcement of all the provisions of this Agreement.

## 7. FINANCIAL SECURITY

7.1 WELL PLUGGING & ABANDONMENT SECURITY- Operator shall provide Department with financial security in a form acceptable to Department (i.e., surety bond, irrevocable letter of credit with evergreen provisions, bank certificate of deposit, etc.) in an amount equal to or exceeding the reasonably expected estimated total cost of plugging and abandoning the wells drilled by Operator within one (1) year after its completion as a producer or

shut-in well. This well plugging security shall remain in effect until the plugging and abandonment of the well has been completed in compliance with applicable state law. The minimum well plugging security coverage per well acceptable to Department as of the date of this Agreement is as follows and shall be based on the well's measured depth (MD), regardless of its true vertical depth (TVD):

<u>Measured Depth (MD)</u>	<u>Minimum Surety Amount</u>
Less than 5000'	\$ 10,000
5000' to 8500'	\$ 30,000
8500' to 10,000'	\$ 50,000
10,000' and Deeper	\$ 100,000

7.2 Every five (5) years during the term of this Agreement on the anniversary of the Effective Date of this Agreement, new financial security amounts may be instituted at the option of Department by notice in writing from Department to Operator at least six (6) months prior to the anniversary date. Such new security amounts shall equal the original security amounts set forth in paragraphs 7.1 and 7.2 herein adjusted for inflation so that the security amounts will adequately cover the expected financial security obligation costs prevailing at the time of adjustment. The new adjusted security amounts will be rounded off to the nearest ONE THOUSAND DOLLARS (\$1,000.00) and will be computed by multiplying the original security amounts set forth herein by a ratio derived from the Producers Price Index for All Commodities using a base of 1982 = 100, compiled and issued monthly by the U.S. Department of Labor's Bureau of Labor Statistics, as follows:

The numerator of the ratio shall be the index number for the item "All Commodities" for the month appearing in the issue of the index most recently preceding the anniversary when the security adjustment is made.

The denominator of the ratio shall be the index number for the item "All Commodities" for the month of \_\_\_\_\_. The Parties agree that such index number is \_\_\_\_\_.

If the base period of such index should change to other than 1982 = 100, the aforementioned numerator shall be adjusted by the usual method of linkage of base periods to the end that the ratio shall accomplish its purpose; namely, to adjust the dollar amount of the security or securities for changes in the price level between the date of this Agreement and the date when the adjustment is made.

In the event such monthly index should be discontinued, or a new or revised one substituted therefore by the Bureau of Labor Statistics or other agencies of the United States of

America, such new or revised or other similar index shall be used for the purpose of computations as described in this paragraph, using such conversion factors or other devices which may be generally recognized or adopted in connection with requirements based on this index.

## **8. COMPREHENSIVE AND POLLUTION LIABILITY INSURANCE**

8.1 Operator shall, at its sole expense, provide and maintain in full force and effect during the term of this Agreement general comprehensive liability insurance in an amount consistent with industry standards, but not less than TWO HUNDRED FIFTY THOUSAND DOLLARS (\$250,000.00) for each occurrence and ONE MILLION DOLLARS (\$1,000,000.00) aggregate, which shall cover Operator and Department for damage claims including, but not limited to, personal injury, accidental death, and property loss that may arise from operations conducted under this Agreement or any occurrence on or about the Tracts whether such operations are by Operator or anyone directly, or indirectly, employed by Operator. Department shall be named as additional insured as their interests may appear on Operator's liability insurance. Operator shall also maintain equivalent insurance coverage for the operation of its motor vehicles.

8.2 Operator shall, at its sole expense, provide and maintain in full force and effect during the term of this Agreement such pollution liability insurance as shall protect the Commonwealth, the Operator and its contractors, if any, from claims of environmental impairment and pollution that may arise during the execution of this agreement. The amount of pollution liability insurance shall be consistent with industry standards, but not be less than \$1,000,000.00 per occurrence and \$2,000,000.00 in the aggregate. Department shall be named as additional insured as their interests may appear on Operator's liability insurance.

8.3 Operator or its insurer shall be liable to Department for any damage done to Commonwealth property as the result of Operator's operations.

8.4 Operator has the right to self-insure for all coverage named in Section 8.

## **9. DEEP WELL CONTROL INSURANCE AND SAFETY**

9.1 Prior to the beginning of well-drilling operations on a true vertical depth (TVD) well of 10,000 feet or deeper, Operator shall acquire well-drilling insurance coverage in an amount estimated to be sufficient as specified below to cover control of well, seepage and leakage, pollution, cleanup and contamination, unlimited redrilling and/or reworking expenses, and equipment in Operator's care, custody and/or control. This insurance coverage shall be continuously maintained until the cessation of any well-drilling operations, well-reworking operations, well-completion operations and well-to-pipeline-hookup operations. Operator shall have Department listed as an additional insured on its well-drilling insurance policy.

9.2 Operator shall obtain well-drilling insurance in an amount consistent with industry standards, but not less than TWENTY MILLION DOLLARS (\$20,000,000.00), for wells drilled into the Trenton-Black River formation unless Department waives or modifies this amount in writing upon Operator's request.

9.3 Operator shall provide a complete copy of the Well Control Insurance Policy to Department and shall not commence well drilling operations until Department has given its written acceptance of the Well Control Insurance Policy. Operator shall not seek to terminate the well-drilling insurance coverage without prior written approval of Department.

## **10. OPERATIONS, PROTECTION AND CONSERVATION**

10.1 Operator submits herewith to the Department, with a copy to the District Forester, conceptual development plans for the Tracts in order to provide the Department with the opportunity to identify concerns and facilitate early resolution.

10.2 Operator shall submit to the Department, with a copy to the District Forester, detailed written plans for any proposed construction on the Tracts at least thirty (30) days prior to the planned commencement of such construction unless, upon due cause shown, Department waives the thirty (30) day requirement and allows a shorter, but reasonable, time for review. In the event the Department does not address any concerns within the thirty (30) day time frame, the Department will be deemed to have accepted the development plan as proposed. Such plans shall, at a minimum, provide a plat showing the location of the proposed well pad and all associated infrastructure to be constructed, including but not limited to road, pipelines, compressor stations, and fresh water impoundments. Operator shall also submit to the Department, with a copy to the District Forester, for review information regarding any species or ecological resources of special concern identified, any correspondence with jurisdictional agencies related to the protection of such resources, any ecological surveys performed, any wetland delineations completed, and any other information available relating to the natural resources on the surface areas to be disturbed. Operator shall also submit for review its plans for restoration of the surface areas disturbed during oil and gas development.

10.3 Operator shall carry on all operations under this agreement with all due diligence and in a good and workmanlike manner, in accordance with the best and most up-to-date oil and gas field practices.

10.4 Operator is responsible for conducting its operations in such a manner so as not to interfere with the rights and interests of others in the Tracts covered by this agreement.

10.5 Before any earthmoving activities take place, Operator shall prepare a soil erosion and sedimentation control plan, which shall include a post-construction storm water management plan, as required by the Pennsylvania Department of Environmental Protection ("DEP") or the applicable County Conservation District office. The plans shall be provided electronically and in hard copy to the District Forester prior to the commencement of construction.

10.6 Operator shall construct a fence according to District Forester specifications around all potentially dangerous surface structures or equipment to prevent public access, including any fencing deemed necessary by the District Forester to protect the public. All equipment which is unguarded and unfenced shall be posted with hazard warning signs.

10.7 Operator shall conduct all operations in compliance with the following:

(a) STIPULATIONS FOR PROTECTION AND CONSERVATION OF STATE FOREST LANDS set forth in **Exhibit "C"**, attached hereto and made a part hereof;

(b) INVASIVE PLANTS AND REVEGETATION GUIDELINES FOR STATE FOREST LANDS set forth in **Exhibit "D"**, attached hereto and made a part hereof.

(c) SURFACE USE AGREEMENT ACCESS ROAD SPECIFICATIONS FOR STATE FOREST LANDS, identified as **Exhibit "E"**, attached hereto and made a part hereof.

10.8 Operator is advised that heavy hauling restrictions may be placed on State Forest roads during certain times of the year when conflicts are greatest between Operator's operations and the recreation opportunities offered on State Forest lands. State Forest Districts with active gas operations will provide written formal notification of potential high conflicts to all operators to aid in their planning and scheduling. The Department defines heavy hauling as trucks with a hauling capacity greater than one (1) ton often necessary for activities including, but not limited to, rig moves, water trucking, and hydraulic fracturing. Heavy hauling and seismic testing activities on State Forest lands will be prohibited on the following approximate dates:

- Opening weekend of trout season in mid-April
- Opening weekend of youth spring gobbler season in late-April
- Opening weekend of regular spring gobbler season in mid-April to early-May
- Memorial Day weekend on the last Monday of May and the preceding weekend days
- Fourth of July holiday or weekend
- Labor Day weekend
- Regular bear season in mid-November
- Regular firearms deer season in late-November to early/mid-December
- Opening day of deer archery season
- Opening day of youth/special use hunting
- Opening day of early muzzleloader season
- Special activities or events on State Forest as identified by the District Forester

The District Forester in each district will publish and make available by January 15th of each calendar year the detailed dates and times of the above listed events to the Operator such that the Operator shall have sufficient time to plan its operations to accommodate and minimize the conflicts.

10.9 Operator shall quantify the existing ambient noise level at the proposed location by establishing the equivalent sound level (Leq) for a consecutive twenty-four hour period during "leaf off" conditions.

- a. The Leq shall be measured a point 300 feet from the proposed location of the compressor during project planning stages.
- b. The operating noise level of the compressor station shall not exceed an Ldn of 55 db (A) at any distance greater than 300 feet from the compressor building. The operator will be required to utilize available technologies and sound mitigation strategies to assure compliance with this standard.

To the extent possible, Operator shall establish vegetative screening around the perimeter of the construction footprint at the direction of the Forest District Manager.

## 11. DRILLING RESTRICTIONS

11.1 Under Department's multiple use policy, the surface of the Tracts are continuously used for recreation, conservation and other purposes, and many other Department-authorized activities may be in progress on the Tracts. Hence, Operator shall conduct its operations so as to minimize interference with the other Department-authorized activities on the Tracts and shall comply with the following restrictions.

No earth disturbance activities related to natural gas development are permitted on the surface within:

- (a) 200 feet of any building;
- (b) 200 feet of any stream or body of water;
- (c) 300 feet of any stream or other body of water designated by DEP's Environmental Quality Board as being Exceptional Value Waters;
- (d) 300 feet of any picnic area or sheltered area which has been so designated by Department;
- (e) 300 feet of any trail, road, or existing right-of-way;
- (f) 300 feet of any area of historic value tree plantation, designated overlook, designated vista or fire tower site;
- (h) 600 feet of the boundary line of State Park lands or State Forest lands designated as Wild and Natural Areas, with the exception of the Loyalsock Pad W, where a 300 feet buffer will be maintained around the Devil's Elbow Natural Area.

In addition, the Department has identified certain Non-Development Areas and Areas of Special Consideration on the Tracts as shown on Exhibit "F" and Operator shall adhere to the following requirements:

- (i) The Tracts contain approximately \_\_\_\_\_ acres more or less of special ecological features as shown on **Exhibit "F"**. Operator is required to carefully coordinate and pre-plan all exploration and development activities within these areas with District Forester and ecological Services to prevent the unnecessary destruction of species, habitat, or a combination thereof. Additionally, due to the changing nature of the Department's environmental databases, such as the Pennsylvania Natural Heritage Program (PNHP), Operator should check with District Forester before any construction project is initiated to avoid potential conflicts as these areas are subject to change without notice. Monitoring, mitigation, and/or avoidance measures may be required including, but not limited to, seasonal avoidance buffers or habitat enhancement measures;
- (ii) The Tracts contain approximately \_\_\_\_\_ acres, more or less, of important recreational areas as show on **Exhibit "F"**. Operator is required to carefully coordinate and pre-plan all exploration and development activities within these areas with the District Forester to prevent unnecessary disruption of important recreational areas wherever possible.

**11.2** Upon written request by Operator, Department may provide written waiver or modification of any portion of the above restrictions if, in Department's judgment, such a waiver or modification is justified and in its best interests.

**11.3** No drilling or production activity, including but not limited to well drilling and construction, pipeline construction, compressor station placement and construction, or road construction shall be permitted within the defined boundaries of any State Park and any State Forest land designated as a Wild Area or a Natural Area as shown by the appropriate boundary demarcation on the surface. No waiver of this provision may be granted.

## **12. DRILLING OPERATIONS**

**12.1** Operator shall submit to Department and to District Forester for their approval as to location, a plat showing the location of each well before drilling is commenced, and no well shall be commenced until a permit has been issued by DEP.

**12.2** A legible sign listing the name and address of the well operator, the permit number, the farm name, and well number shall be placed in a conspicuous place near where the access road enters the well location. In addition, a legible sign listing the name of the operator and well number shall be attached or painted on the pumping unit, wellhead or meter box of each well.

**12.3** Operator, its agents, contractors and subcontractors, and employees of contractors and subcontractors, shall not allow the well to blow open for over twenty-four (24) hours after drilling, except in case of an emergency.

12.4 Operator shall, at all times, conduct prudent drilling operations including the setting and cementing of casing in such a manner as will permit the production of gas, and liquid hydrocarbons, without waste and including the taking of all reasonable precaution by the use of proper equipment and drilling practices as will protect persons and property against fires and hazards from blowouts.

12.5 Operator shall take all safety precautions necessary to prevent the uncontrolled escape of hydrogen sulfide (H<sub>2</sub>S) gas from gas wells and facilities.

12.6 During well drilling and production operations, in order to reduce night lighting pollution in designated dark sky areas, Operator is required to utilize drilling rigs equipped with fully shielded lighting consistent with Occupational Safety & Health Administration (OSHA) regulations and other applicable state and federal requirements.

12.7 Upon written request by Operator, Department may waive, in writing, any portion of the above drilling requirements if, in the Department's judgment, such a waiver is justified by new technology or knowledge and/or will be in the best interest of the Commonwealth.

### **13. CONFIDENTIALITY**

13.1 Records that Operator provides to the Department may be subject to public disclosure under the Pennsylvania Right-To-Know Law, act of February 14, 2008, P.L. 6, No. 3, 65 P.S. § 67.101 et seq. Operator shall advise Department in writing of any records submitted pursuant to this Agreement that contain trade secrets or confidential proprietary information. Department shall maintain such records solely for use by the Commonwealth as provided below and shall not disclose such records to any third party unless Operator consents or Department is directed to do so pursuant to a court order. The Department shall notify Operator of any request received for such records.

### **14. GAS PIPELINES**

14.1 Any proposed pipeline that will exceed twenty-four inches (24") in diameter shall be approved, in writing, prior to construction by both the District Forester and the Minerals Section of the Bureau of Forestry.

14.2 Operator is granted the right to lay any necessary gas pipelines on or under the Tracts; however, a route map for each line shall be submitted, upon request and for approval, to the District Forester s to location prior to the laying of that line.

14.3 Operator shall, at all times during the continuance and delivery of gas, and liquid hydrocarbons to the market, manage, maintain, and repair its pipelines and equipment to avoid any leaks or waste of gas and liquid hydrocarbons.

### **15. SEISMIC SURVEYS**

15.1 Operator, its agents, contractors and subcontractors, and employees of contractors and subcontractors shall have the right to conduct seismic surveys over and across the Tracts. Prior to conducting any seismic work, Operator shall submit for approval to the District Forester, a map showing the proposed location of each and every seismic line. When Operator's seismic lines cross State Forest lands not already under lease to Operator, Operator must obtain a separate seismic survey agreement from Department.

## 16. PLUGGING

16.1 Operator shall properly and effectively plug all wells on the Tracts before abandoning, in accordance with the requirements of the DEP and all applicable state and federal laws, rules and regulations.

16.2 For any well drilled under the terms of this Agreement which shall be plugged, Operator shall provide a proposed plugging plan to Department and shall obtain written approval of the plan from the Department prior to filing a notice of intent to plug with the DEP. In the case of an emergency requiring a well to be plugged immediately, prior approval by the Department is not required provided that plugging is completed as directed by the DEP or another appropriate state or federal authority.

16.3 In no case shall brush plugging be proposed or be used to plug any wells drilled under the terms of this Agreement.

16.4 A copy of the Certificate of Well Plugging showing the plugging procedure used and submitted to the DEP shall be supplied to the Minerals Section, Bureau of Forestry for each well plugged and abandoned. In addition, upon completion and plugging of a well, a permanent marker of concrete or any other marker approved by Department shall be erected over the well. The marker shall extend from ten (10) feet below the surface to at least two (2) feet above the surface. The name of the person, firm, company, or corporation by whom the well was drilled and the number of the well shall be stamped, cast, or otherwise permanently made a part of the marker. The erection of the marker shall in no way interfere with the vent pipe if one is required.

16.5 Failure to comply with the above plugging requirements may result in forfeiture of the well plugging financial security to fund the proper plugging of the well or wells by Department.

## 17. OPERATOR'S TERMINATION

17.1 Operator may, at any time, or from time to time, surrender this agreement or a portion of the Tracts if Operator is not then in default of any obligations under this Agreement; provided, however, that such surrender must be evidenced by written notice delivered to Department thirty (30) days prior to the effective date thereof, and that Operator has performed all commitments with which Operator is charged to the effective date of surrender. Any amount

paid as an advance surface use payment previous to the effective date of the surrender shall be deemed liquidated damages due Department and shall not be prorated or subject to claim by Operator for return to Operator.

## **18. FORCE MAJEURE**

**18.1** In the event that Operator is prevented from complying in a timely manner with any time limit imposed in this Agreement solely because of a strike, fire, flood, act of God, or other circumstances beyond Operator's control and which Operator, by the exercise of all reasonable diligence, is unable to prevent, then Operator may petition Department for an extension of time. An increase in the cost of performing the obligations set forth in this Agreement shall not constitute circumstances beyond Operator's control. Operator's financial inability to comply with any of the obligations of this Agreement shall not be grounds for any extension of time.

**18.2** Operator shall only be entitled to the benefits of this Section if it notifies Department within five (5) working days by telephone and within ten (10) working days in writing of the date it becomes aware or reasonably should have become aware of the event impeding performance. The written submission shall include all necessary documentation, as well as a notarized affidavit from an authorized representative of Operator specifying the reasons for the delay, the expected duration of the delay, and the efforts which have been made and are being made by Operator to mitigate the effects of the event and to minimize the length of the delay. The initial written submission may be supplemented within ten (10) working days of its submission. Operator's failure to comply with the requirements of this Section specifically and in a timely fashion shall prevent Operator from using this Section to excuse any failure to comply with any obligation of this Agreement relating to the particular incident involved.

**18.3** Department shall decide whether to grant all or part of the extension requested on the basis of all documentation submitted by Operator and other information available to Department. In any subsequent litigation, Operator shall have the burden of proving that Department's refusal to grant the requested extension was an abuse of discretion based upon the information then available to the Department.

## **19. REMOVAL**

**19.1** Operator shall have six (6) months after termination, abandonment, or surrender of the Agreement for all or part of the Tracts, in which to plug and abandon all wells; remove all buildings, machinery, equipment, structures, unused pipelines, rubbish, and debris resulting from Operator's operations; to fill and level all pits; and to the extent practicable, to restore the Tracts (or the part surrendered) to the same condition as when received.

## **20. RIGHTS RESERVED BY DEPARTMENT**

20.1 Department reserves the right to use the Tracts in any and all respects not specifically limited by the terms of this Agreement.

## **21. THIRD PARTIES' RIGHTS**

21.1 The public shall have access to the Tracts, including areas surrounding Operator's facilities that do not pose a safety hazard. Operator shall control public access to areas that present a safety hazard or as necessary to protect Operator's private property. Operator shall set reasonable restrictions on access to such areas and allow public access to observe Operator activities.

## **22. DISPUTE RESOLUTION**

22.1 In the event that Operator wishes to dispute a decision made by Department, the following procedure shall be used:

- (a) Operator shall notify the Department in writing of the decision in dispute and provide Department with Operator's position on the issue, along with all appropriate supporting documentation.
- (b) Within ten (10) business days from the date of the Department's receipt of the Operator's written notice of the dispute, Department shall fix a time and place for a conference with Operator to discuss the disputed decision.
- (c) The conference shall be held within thirty (30) days of the Department's receipt of the Operator's written notice of the dispute, unless Department and Operator agree to an extension of time for the conference.
- (d) At such conference, the Director of the Bureau of Forestry or his/her representative shall represent Department.
- (e) Department may continue the conference if supplemental data, maps or other information are required to evaluate the basis for Operator's objections, if further review is needed to ascertain whether a mutually agreed upon settlement is consistent with the terms of the Agreement, or if all parties to the conference agree that a continuance is beneficial to the resolution of the objection.
- (f) Any agreement(s) reached at the conclusion of the conference or follow-up discussions shall be consistent with the provisions of this Agreement. A record of such agreement(s) shall be documented in writing by the Department, copies of which shall be provided to the Operator, the appropriate District Forester, and all other parties involved.

23.2 In the event that a Party is dissatisfied with the decision(s) made as a result of the dispute resolution conference, it may submit the dispute to an appropriate forum, including a court, for further consideration or review. Any judicial review or court action shall be de novo.

## 23. HEADINGS

23.1 The paragraph headings herein are for reference only and are not intended to have any legal force or effect.

## 24. RELEASE

24.1 Operator shall not be granted a final release from the terms of this Agreement until all records and reports and other data described above have been provided to the Department, all wells required by the Department to be plugged have been plugged and plugging certificates provided, all other terms of this Agreement have been met, and the District Forester has met with Operator's field engineer or other authorized representative on the ground, inspected the premises, and both Parties have signed a Statement of Release indicating that any necessary site restoration has been completed. Said release shall not be unreasonably withheld by the Department. In the absence of a two-party signed Statement of Release, the Department shall accept the District Forester's findings based on his/her independent inspection of the Tracts. A copy of the release statement will be provided to the Minerals Section, Bureau of Forestry.

## 25. BINDING EFFECT

25.01 This Agreement shall be binding upon and inure to the benefits hereto, and their respective successors and permitted assigns.

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY BLANK.]

IN WITNESS WHEREOF, Department and Operator have caused this Agreement to be duly executed and have caused their seals to be hereto affixed and attached by their proper officers, all hereunto authorized, on the date first above written.

**ANADARKO E&P COMPANY LP**

\_\_\_\_\_  
Name: \_\_\_\_\_

Title: \_\_\_\_\_

Tax ID #: 73-0739973

**ANADARKO MARCELLUS MIDSTREAM, L.L.C.**

\_\_\_\_\_  
Name: \_\_\_\_\_

Title: \_\_\_\_\_

Tax ID #: 26-4610122

**COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF CONSERVATION AND  
NATURAL RESOURCES**

\_\_\_\_\_  
Daniel A. Devlin  
State Forester  
Director, Bureau of Forestry

APPROVED AS TO LEGALITY AND FORM:

\_\_\_\_\_  
CHIEF/ASSISTANT COUNSEL  
DEPARTMENT OF CONSERVATION AND  
NATURAL RESOURCES

\_\_\_\_\_  
OFFICE OF GENERAL COUNSEL

\_\_\_\_\_  
OFFICE OF ATTORNEY GENERAL

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF  
CONSERVATION AND NATURAL RESOURCES**

**EXHIBIT "C"**

**STIPULATIONS FOR PROTECTION AND CONSERVATION OF  
STATE FOREST AND PARK LANDS**

**1. Environmental Quality Control**

**1.01** Operator shall take all necessary precautions and measures throughout the entire course of this agreement to insure strict compliance with all applicable federal, state, and local laws and rules and regulations promulgated thereunder, whenever enacted, including but not limited to the following state statutes: the Air Pollution Control Act, as amended (Act of January 8, 1960, P.L. 2119, 35 P.S. 400 I, et seq.); the Clean Streams Law, as amended (Act of June 22, 1937, P.L. 1987, 35 P.S. 691.1, et seq.); the Solid Waste Management Act, as amended (Act of July 7, 1980, P.L. 380, No. 97, 35 P.S. 6018.101, et seq.); the Oil and Gas Act, as amended (Act of December 19, 1984, P.L. 1140, No. 223, 58 P.S. 601.101 et seq.); and the Surface Mining Conservation and Reclamation Act, as amended (Act of May 31, 1945, P.L. 1198, 52 P.S. 1396.1 et seq.).

**1.02** Notwithstanding any provision in this agreement, Operator shall be held liable by the Commonwealth of Pennsylvania, or any agency of the Commonwealth, for the violation of any relevant laws, rules, and regulations.

**1.03** Before any surface or subsurface disturbance, Operator shall acquaint itself with all of the applicable rules and regulations governed by each respective Act.

**1.04** Prior to undertaking actual mining, drilling, or quarrying, Operator shall confirm, in writing, to Lessor that it has reviewed and thoroughly understands the applicable requirements as contained in each of the aforementioned Acts.

**1.05** During mining, drilling, or quarrying, Operator shall comply with all of the current applicable rules and regulations of the foregoing Acts. Where any of the rules and regulations differ concerning abatement of pollution the more stringent rules shall apply.

**1.06** Operator shall, at all times, perform its work in such a manner as to substantially minimize the possibility of polluting the air land or bodies of water with any materials harmful to the environment.

**1.07** As development of the agreement premises progresses and unforeseen circumstances arise that were not evident during the design, emergency pollution control programs shall be put into effect immediately. In such cases further instructions will be issued by Lessor and will be carried out by Operator.

1.08 The Air Pollution Control Act of the Commonwealth prohibits the burning of any refuse, rubbish, brush, etc. in the designated air basins of the state, except by approval of the Department of Environmental Protection's respective Regional Air Pollution Control Engineer. Other emissions into the atmosphere are not permitted if they are injurious or hazardous to people, animals, or vegetation.

1.09 Operator shall strictly adhere to all rules and regulations for collection, removal, transportation, and disposal of solid wastes. Littering of the agreement premises will not be permitted.

1.10 The discharge of wastes to streams within the Commonwealth will not be permitted unless such discharges meet the standards of the Department of Environmental Protection.

## **2. Protection of Property and Operations**

2.01 Operator shall not use or allow to be used the State Forest lands for any other purpose than that authorized by this agreement. District Forester will be advised when operations begin and end. Any changes in the original plans, which may be necessary subsequent to the beginning of operations, must be approved by District Forester and Lessor.

2.02 Permission to remove overburden must first be obtained from District Forester who will designate the extent of such removal.

## **3. Public Land Use**

3.01 Operator hereby recognizes and admits that the agreement premises are dedicated to the purposes set forth in Environmental, Health, Park, Fish and Game Laws, and Rules and Regulations and Department's Forest Resource Plans promulgated thereunder and Operator agrees to conduct operations with deference to such purposes.

## **4. Hunting and Fishing**

4.01 Employees of Operator, its agents, contractors and subcontractors, and employees of contractors and subcontractors shall not engage in hunting or fishing upon said land, except as permitted by law.

## **5. Animals**

5.01 Operator shall prevent access of wildlife to pits or excavations dug for Operator's operations by erecting and maintaining fences, or by other means approved by Department.

## **6. Slush Pit**



**7. Siltation**

7.01 Operator agrees to have on site an approved site-specific Erosion and Sedimentation Control Plan in accordance with the Department of Environmental Protection's Rules and Regulations, Title 25, Chapter 102. Operator realizes that, as a result of its operation, large areas of land which will be cleared to provide for compressor stations, pipeline rights-of-way, and drilling sites, and which will be exposed to the forces of erosion for varying periods of time could create siltation to nearby streams. Operator agrees, therefore, to regrade such areas immediately and reseed to either temporary or permanent grasses. Any other type of remedial work necessary to prevent erosion on such areas shall be performed by Operator.

7.02 Operator shall, upon initial construction of all drilling sites, restore all highwalls and reseed said highwalls and down slope embankment of each drilling site immediately. Department's representative shall be consulted for final design and approval of each drilling site prior to final restoration.

7.03 Operator's contractors and subcontractors shall not construct earthen dams across any stream to obtain a water supply for its operations unless approved by Department.

7.04 Operator shall, on pipeline rights-of-way and access roads, construct water bars or similar diversion channels to carry surface runoff away from the rights-of-way and roads to prevent siltation. During construction, if excess siltation is expected, Operator shall construct a

settling basin at the base of the right-of-way or road to impound runoff and allow sediment to settle prior to discharge into nearby streams.

**7.05** Operator shall construct all access roads to all drilling sites along existing pipeline rights-of-way, where applicable, which are built to service the drilling site, provided that a ten percent (10%) grade can be maintained. All road locations and grades must be approved by District Forester as provided hereunder. All roads will be maintained in a passable condition as per Exhibit D unless modified by District Forester.

**7.06** Operator shall be responsible for the performance of maintenance of all erosion and sedimentation control facilities and devices.

## **8. Waters**

**8.01** Without prior approval of Department, Operator shall not locate any bore or core hole or any part of rig or slush pit within one hundred (100) feet, or more if required by District Forester, of any stream or body of water on State Forest lands, and hereby agrees to prevent the contamination or pollution of springs, brooks, streams, or other waters on these lands in any manner whatsoever.

**8.02** Where construction, operation, or maintenance of any of the facilities on causes damage to the watershed or pollution of the water resources, Operator agrees to repair such damage and to take such corrective measures to prevent further pollution or damage to the watershed as are deemed necessary by an authorized representative of Department and to pay for any and all damage or destruction of property, fish, and wildlife resulting from operations under this agreement.

**8.03** The cost of said property, wildlife, or fish destroyed shall be determined by Department, Pennsylvania Game Commission, or Pennsylvania Fish and Boat Commission using recognized procedures to establish the value of damage.

## **9. Forest Growth**

**9.01** Operator shall not cut, injure, destroy, or remove any forest growth, except that which shall be absolutely unavoidable in conducting its operations and shall obtain proper approval of District Forester ninety (90) days before removal is to be commenced. The full ninety (90) days prior notice may be reduced upon the discretion of District Forester.

**9.02** Operator, under the direction of Department, shall dispose of all tree tops, limbs, brush, slash, and any other forest growth not to be sold or utilized by Department or Operator which have resulted from clearing operations from strip mine sites, well sites, access roads, pipeline rights-of-way, and other construction sites, according to a plan approved by District Forester.

9.03 Operator shall dispose of all tree stumps and large rocks resulting from its clearing and construction operations using a plan approved by District Forester.

9.04 Operator shall pay Department for all forest growth cut or injured on State Forest land as a result of Operator's operations, regardless of the ownership of the oil, gas, mineral, or surface support rights. Even though Department has been paid for the damage by Operator, the title to all forest growth will still belong to the Commonwealth, except as provided in Paragraph 9.06. Damage is defined as the cutting or injuring of the forest growth by clearing a site so that personnel and equipment can be brought onto the location to establish a base from which Operator can undertake its operation.

9.05 Prior to the clearing of the forest growth by Operator, District Forester will mark and/or designate the area from which forest growth will be removed. The value of the forest growth that will be cut or damaged for the clearing of a road, drilling site, or area to be mined, will be determined by Department based upon timber type, size, and market data, or upon replacement value, for young stands or plantations. Operator shall then be invoiced for the value as determined by Department. Payment to Department of said invoice must be made before any forest growth may be cut or damaged.

9.06 Operator shall pay for the forest growth damage, as determined by Department; the forest growth shall then become Operator's property, which then must be removed and sold by Operator as job requirements dictate. Ownership of the forest growth, not removed and sold by Operator under this subsection, shall revert to Department six (6) months after invoicing unless modified in writing by District Forester. The minimum forest growth damage charge shall be FIVE THOUSAND DOLLARS (\$5,000.00) per acre or as determined above whichever is greater.

9.07 Operator shall, at direction of District Forester and at its own expense, secure, plant, and maintain grasses and/or trees or shrub seedlings and/or game foods on all strip mine sites, well sites, access roads, pipeline rights-of-way and other cleared areas using a plan approved by District Forester. Timing shall be determined by District Forester. Revegetation should be periodically maintained (i.e., liming or fertilizing).

9.08 Operator shall make full compensation to Department at three (3) times the value of such forest growth cut, injured, destroyed, or removed, to be computed by Department, should additional damage result at any time from the work incident to this agreement or the construction, operation, maintenance, or removal of facilities not herein contemplated or specifically mentioned, but which may occur as a result of said work or facilities, or should any forest growth be cut, injured, destroyed or removed prior to payment thereof under Paragraph 9.05 hereof, or due to negligence or unauthorized activities.

## 10. Fire

10.01 Operator's employees, agents, contractors, and subcontractors, and employees of contractors and subcontractors shall do everything within their power to prevent or suppress

forest fires and shall not allow fires to be set on or adjacent to State Forest lands by Operator, its agents, contractors and subcontractors, and employees of contractors and subcontractors, except in pursuance to and in accordance with the conditions prescribed in the permission first obtained from District Forester fixing the time, place, and manner of burning. The burning of refuse, brush, slash, debris, or other materials, shall be conducted as prescribed in burning plans approved by District Forester, and shall be so conducted that no living forest growth is damaged or killed.

10.02 Should any fire set by Operator or any of the persons mentioned above escape in any manner or damage any State Forest land or other property, Operator shall be liable for all such damages resulting from such escape and for all costs incurred by Department in fighting such fires; and Operator's officers, agents, and employees in the vicinity, as well as contractors and subcontractors, shall with such assistance as Operator may have at hand, or be able to summon, render aid in fighting said fire without cost to the Commonwealth.

10.03 Operator further agrees that during periods of abnormal forest fire danger, District Forester may suspend all or part of the drilling, or other operations on all or part of the State Forest lands until the forest fire danger subsides.

10.04 Operator, or its employees, shall report promptly all forest fires detected by them to District Forester.

#### 11. Replacement and Repair of Improvements

11.01 Operator shall replace or repair, as Department may direct, all State Forest signs, markers, comers, fences, other structures, and service utility lines owned or used by Department, which cross or otherwise lie within the State Forest lands destroyed or damaged in any work incident to this agreement.

#### 12. Roads, Quarry, and Drilling Sites

12.01 Before drilling sites and access roads are constructed, Operator shall obtain the District Forester's approval of its plans for such activities. Any roads built at the expense of Operator in its operations shall not be removed or destroyed and shall become a part of the road system of the State Forest lands, unless otherwise directed by District Forester.

12.02 Operator recognizes that all roads and trails owned or maintained by Department, which are used in the execution of this agreement, were constructed and improved for the use of Department and for the general public having business in and making use of State Forest land. Operator, therefore, agrees that its operations will be subject to Department approval. Department will provide reasonable accommodation when necessary.

12.03 Where roads built by Operator cross any fence, Operator shall construct a gate and keep it closed except when the passageway is in use. Operator shall keep all said roads and trails free at all times from obstruction by logs, brush, or debris resulting from Operator's

operation. District Forester may require Operator to temporarily discontinue the use of said roads whenever, in his opinion, such action is necessary to prevent their serious damage.

**12.04** Upon termination of this agreement, Operator shall repair said roads and trails and leave them in as good condition as at the beginning of this agreement of which condition Department shall be the sole judge. In addition, Operator shall make any repairs to said roads and trails deemed necessary by District Forester to insure adequate and proper drainage, road surface conditions, horizontal alignment, and cross slope.

**12.05** Operator, in its operations, is hereby granted the right to use all State Forest roads, both on or off the agreement premises, provided that Operator agrees to obtain prior written approval from District Forester and to repair any damage to all State Forest roads, on or off the agreement premises, when such damage is caused by Operator's operations; provided, however, if in the opinion of the District Forester in charge, the roads or portions thereof are used by others sufficiently to warrant the apportionment of the maintenance costs, then Operator may be relieved of the burden of sole maintenance and be required to provide only Operator's proportionate share as decided by Department through District Forester.

**12.06** It is understood that the bond required, under the terms of this agreement, shall cover the use and repair of all State Forest roads, bridges and culverts on and off the agreement premises utilized by Operator in conduct of operations under this agreement.

**12.07** Operator recognizes the rights and privileges afforded to Grantees by rights-of-way and other agreements executed with Department, prior to this agreement, which cross or otherwise lie within the area of this agreement; and, therefore, agrees to relocate at Operator's own expense, all portions adversely affected by work incident to this agreement in accordance with the then current rules and orders of the Public Utility Commission of the Commonwealth of Pennsylvania. In the event the Public Utility Commission does not have any jurisdiction, any necessary relocation shall be completed subject to the approval of Grantor.

### **13. Buildings**

**13.01** Operator shall not drill any bore or core hole, carry on operations, make excavations, or otherwise disturb the surface of the lands within two hundred (200) feet of any building. However, if a lesser distance to any building is needed, written approval must be obtained from District Forester.

**13.02** Operator shall consult with District Forester and obtain written approval prior to the construction and erection of any storage facilities, buildings, work sheds, or any other physical structure upon State Forest lands.

### **14. Appearance**

**14.01** Operator shall, at all times, maintain State Forest lands in a neat and presentable manner, removing all rubbish and debris as it accumulates and restoring each individual area or

facility within thirty (30) days to as near as possible its original condition as directed by District Forester.

**15. Explosives**

**15.01** Operator shall not use explosives at any time or in any manner unless approved by District Forester.

**16. Restoration and Revegetation**

**16.01** Restoration and revegetation shall be accomplished in accordance with Operator's reclamation revegetation plan as approved in advance by District Forester in advance.

**17. Water Wells**

**17.01** Department must approve, in writing, any plan by Operator, including drilling specifications, for the drilling and development of water wells on Tracts.

**17.02** A final plat will be submitted within thirty (30) days after completion of each water well showing exact location, elevation, depth of well, lithology penetrated and thickness of discrete lithologic units, depth to water-bearing horizons, estimates of flow rates, results of draw down tests, and results of chemical and bacteriological analyses if such tests are conducted by Operator.

**17.03** Operator further agrees to supply Department with any other records, driller's logs, memoranda, accounts, reports, cuttings, cores, or other information relative to the drilling, completion, or operation of water wells on the above-described premises. This will include true copies of any electrical or radioactivity surveys made in the wells.

**17.04** Operator shall be familiar with and comply in every respect with the provisions now existing or hereafter enacted of the Water Well Drillers License Act 6 10 of May 29, 1956 (P.L. 1840), providing for the orderly development of the ground water resources of the Commonwealth of Pennsylvania.

**17.05** Department reserves the right to use water from wells drilled by Operator on State Forest land upon approval of Operator. Such approval will subject to Operator's operations and will not be unreasonably withheld.

**17.06** Operator shall contact the District Forester before plugging and abandoning any water well. Water wells must be plugged from bottom to top with clay, cement, or other impervious materials approved by Department. Any water wells that are of no further use in Operator's operations, but are deemed viable for Bureau of Forestry uses, may be acquired by Department at its request, at no cost to Department. Operator, upon relinquishing rights to said water wells, in writing, and upon acceptance of said wells by Department, shall be relieved of any and all plugging and abandonment responsibility.

**18. Pipelines**

**18.01** Operator shall refill to contour all ditches or other excavations caused by the construction, operation, and maintenance, or removal of pipelines; construct cross ditches; lime, fertilize, and seed or replant the right-of-way; keep the pipeline and right-of-way in good repair and appearance, and take such other measures as may be deemed necessary by Department to control erosion and sedimentation and to maintain or restore the natural and aesthetic values as directed by Department.

**19. Rare and Endangered Species**

**19.01** The Pennsylvania Natural Diversity Index (PNDI) shall be searched prior to any earth disturbance to determine possible presence of rare and endangered flora and fauna species of concern.

**19.02** If in the course of its operations, Operator encounters any fauna or flora listed on federal or state registers of threatened or endangered species, or habitat critical to their survival, Operator shall immediately cease operations and contact the District Forester so that arrangements can be made with Bureau of Forestry specialists to field check the site to make all necessary preparations to protect and preserve the fauna and flora which may be endangered.

**20. Historical and Archaeological Sites**

**20.01** If in the course of its operations, Operator encounters any historical or archaeological sites, Operator shall immediately cease operations and contact the District Forester so that arrangements can be made with Historical and Museum Commission specialists to field check the site to make all necessary preparations to protect and preserve the artifacts which may be endangered.

**21. Contacts with State Agencies**

**21.01** Operator shall periodically contact the following state agencies or their successors to keep informed on up-to-date information, policies, rules, and regulations applicable to this agreement.

**COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF CONSERVATION AND  
NATURAL RESOURCES**

**EXHIBIT "D"**

**INVASIVE PLANTS AND REVEGETATION GUIDELINES  
FOR STATE FOREST LANDS**

**1. Pre-construction Inventory and Mapping**

1.1 Operator may elect to perform a pre-construction inventory of invasive plants present on the portion of the premises where construction is planned to determine appropriate prevention methods, predict control needs, and assess its level of responsibility for management of invasive species and populations. The inventory objective is to locate established invasive plant species populations.

1.2 If Operator elects to undertake an inventory as described in Section 1.1, all areas which may be disturbed by the planned construction activity should be inventoried for the plant species listed in DCNR's Invasive Plants brochure during the growing season from May through September by a qualified botanist.

1.3 Inventory data should be collected from the entire area of the planned construction on state forest land and any buffer areas that may be appropriate, in grid cells no greater than 150' x 150' in size. The established grid should be digitized into a GIS layer and printed on maps that will be used for field data accumulation. Standard information including date, surveyor name, and grid cell number should always be recorded prior to beginning the actual survey. During the field study the center of each grid cell should be located using GPS, and an inventory created by noting the presence of any invasive plant species or the complete absence of any invasive species within the specified grid cell and a note of the dominant species per plant type (e.g., herbaceous, shrub, tree) should be recorded. For each invasive species occurrence, the cover class within each grid cell should be recorded as trace, low, moderate, or high, according to the Montana Noxious Weed Survey and Mapping System. All trace and low occurrence locations should be located by GPS to aid in relocation and treatment. For each invasive species in each grid cell, the average growth stage should be recorded as seedling, bolt, bud, flower, seed set, or mature, according to the Montana Noxious Weed Survey and Mapping System.

1.4 If Operator elects to forego the above described pre-construction survey for invasive species, Operator shall be responsible for all occurrences of post-construction infestations of invasive species that may be found in the construction area regardless of origin or amount and will be required to perform management and control activity as described in Section 3 below.

## 2. Prevention

2.1 Where no invasive plants are detected, Operator should use only PA Department of Agriculture certified seed and weed free soil, dirt, and mulch whenever feasible. If materials certified as weed free cannot readily be obtained, the source of materials being used shall be inspected for invasive plants during the growing season by a qualified botanist and used only if deemed weed-free.

2.2 Mulching with straw rather than hay is recommended to reduce the possibility of introducing invasive species propagules.

2.3 Where heavy infestations of Japanese stiltgrass (*Microstegium vimineum*) are detected during pre-construction surveys, a seed mix of Autumn bentgrass (*Agrostis perennans*) and deer tongue (*Dichanthelium clandestinum*) should be planted as aggressive competition against the seed-banked invasive Japanese stiltgrass. Seeding specifications will be provided by the District Forester. As an alternative, application of herbicide to large patches of Japanese stiltgrass during the summer with a 2% glyphosate solution in water mixed with surfactant may be utilized at the direction of the District Forester.

2.4 Operator at its option may, prior to bringing equipment into un-invaded areas or onto state forest land, clean its equipment in an appropriate manner (see <http://www.fs.fed.us/eng/pubs/pdf/05511203.pdf>) to remove plant parts such as rhizomes and seeds that might be carried on tires and the equipment undercarriage, which may help prevent the spread of invasive species onto adjacent lands.

2.5 Pre-treatment of identified invasive species infestations of herbaceous species or species that reproduce prolifically from rhizome/root segments with herbicides prior to construction may be performed at the direction of the District Forester.

## 3. Management

3.1 Management and control of established invasive plant populations shall be planned on a species by species basis to determine the best method of control. Operator and its consultant shall submit a "Management and Control Plan" to District Forester no fewer than three (3) months after the conclusion of all construction activity.

3.2 Operator shall include a post-construction invasive survey report with the same survey parameters as described in Section 1 above, in the Management and Control Plan. The District Forester and Ecological Services Section will assist Operator in the development of appropriate management methods by species and/or invasive occurrence.

3.3 Post-construction invasive species surveys along access roads shall be limited to areas where gravel was placed or the existing road was widened for Operator use. After a period of two growing seasons, any new invasive populations will be assumed to be the

result of sources other than the Operator's construction materials and equipment. Control and monitoring of invasive species found along access roads within two growing seasons post-construction will continue until populations are eradicated.

3.4 Operator and the Bureau of Forestry will coordinate with the other jurisdictional agencies about species of special concern and the potential impacts invasive species management activity may produce.

#### 4. Monitoring

4.1 Operator shall make provisions to monitor for invasive species within the area(s) disturbed by the construction activity for a period of five (5) years following construction or until invasive species are not observed on-site for two consecutive years, whichever is longer.

4.2 Operator shall perform an annual survey for the presence of invasive species within the construction area, as described in 4.1 above, following major construction. The annual survey should follow the same methods as the pre-construction survey method described in Section 1. The only exception to the method described in Section 1 is the grid cell boundaries only need to be checked occasionally with the GPS to ensure that monitoring alignment is consistent with the original inventory alignment.

#### 5. Reporting

5.1 The results of all Operator annual invasive surveys shall be summarized into a report, which shall include the following elements: methods, a summary of invasive species detected, abundance of each species, number of new populations per species, number of eradicated populations by species, and management recommendations for management and control. Report and raw electronic observation data shall be submitted to District Forester and Ecological Services within 60 days following completion of the report. Submission of any electronic data should occur simultaneously with the written report submission. Data recording and management should be consistent year-to-year so data can easily be compared by grid cell number. The Department reserves the right to audit the findings of the Operator's reports and as a result of any audit, Department may require alternate methods of management and control.

5.2 Department may publish reports, raw data, or articles summarizing invasive species management and monitoring efforts from time to time. Operator will be consulted prior to publication of any reports or raw data for comment.

#### 6. Revegetation Plan Guidelines

6.1 Operator shall utilize a native grass and herb mix for cover and stabilization within the disturbed construction areas. The required seed mix will provide for immediate stabilization and reduce the chance of invasive species establishment. Operator shall provide for a cover crop to be mixed in with the native grass and herb mix. The cover crop will be either

oats or barley if the seeding takes place in the spring or wheat or rye if the seeding takes place in the fall. The cover crop seed mix may be applied at the same time as the native grass and herb mix described below. Hydro-seeding of all seed mixes is acceptable. The cover crop should be applied at 30 lbs./acre. The detail components of the native grass and herb mix are listed below:

Native Grass and Herb Mix

- 20% Little Bluestem PA ecotype (*Andropogon scoparius*)
- 10% Big Bluestem variety "Niagara" (*Andropogon gerardii*) (genetic origin is NY)
- 15% Virginia Wild Rye PA ecotype (*Elymus virginicus*)
- 10% Indiangrass PA ecotype (*Sorghastrum nutans*)
- 10% Deertongue variety "Tioga" (*Panicum clandestinum*)
- 5% Swithgrass variety "Shelter" (*panicum virgatum*) (genetic origin is WV)
- 5% Partridge Pea PA ecotype (*Chamaecrista fasciculata*)
- 3% Showy Tick Trefoil PA ecotype (*Desmodium canadense*)
- 5% Ox-eye sunflower PA ecotype (*Heliopsis helianthoides*)
- 2% Autumn bentgrass PA ecotype (*Agrostis perennans*)
- 2% Woolgrass PA ecotype (*Scirpus cyperinus*)
- 3% Soft Rush PA ecotype (*Juncus effuses*)
- 5% Pennsylvania smartweed PA ecotype (*Polygonum pennsylvanicum*)
- 5% Common Milkweed PA ecotype (*Asclepias syriaca*)

6.2 The recommended seeding rate for the native grass and herb mix is 15.0 lb. /acre. No lime or fertilizer is needed for the Native Grass and Herb Mix. Topsoil should be utilized when possible. Seeding may be accomplished by the broadcast, hydro seeding or drill seeding methods. The Native Grass and Herb mix will be mulched with 1.5 ton/acre of straw mulch.

6.3 The Bureau of Forestry has the right to change the components of the Native Grass and Herb Mix as needed to reflect species that may be more appropriate to the region or habitat that is being altered.

6.4 The use of conifers and shrub plantings for revegetation of well pad sites will be used if determined appropriate by the District Forester. As directed by the District Forester, the disturbed work area will be revegetated with conifers and pockets of shrubs where topography allows. The conifer species include white pine (*Pinus strobus*), Pitch pine (*Pinus rigida*), Virginia Pine (*Pinus virginiana*) (south of route 80) and Red Pine (*Pinus resinosa*) (north of route 80). Pockets of shrubs should be planted approximately every 100 feet. These pockets of shrub plantings will comprise approximately 200 square feet (10' X 20'). Each pocket will be planted with 10 -15 shrubs using seedlings. Seedlings to be planted include any mix of staghorn sumac (*Rhus typhina*), smooth sumac (*Rhus glabra*), red and black chokeberry (*Aronia arbutifolia* and *A. melanocarpa*), New Jersey tea (*Ceanothus americanus*), flowering dogwood (*Cornus florida*), Virginia creeper (*Parthenocissus quinquefolia*), blackberry (*Rubus allegheniensis* or *R. pensilvanicus*), blackgum (*Nyssa sylvatica*), ninebark (*Physocarpus opulifolius*), choke cherry (*Prunus virginiana*), American elderberry (*Sambucus canadensis*), stepple bush (*Spiraea latifolia*), highbush blueberry (*Vaccinium corymbosum*), muscle wood

(*Carpinus caroliniana*), nanny berry (*Viburnum lentago*), Northern arrowwood (*Viburnum recognitum*), Cockspur hawthorn (*Crataegus crus-galli*) and scrub oak (*Quercus ilicifolia*). These plantings will need to be fenced to protect from damage by browsing herbivores. Fencing will consist of 8' woven wire fence or as determined by District Forester. Posts, fencing, other materials, seedlings and labor will be provided by Operator. Operator will also be responsible for fence maintenance. Revegetation with shrubs and fencing will not be required on steep slopes. Conifer planting is applicable on slopes where safe to do so.

**6.5** Basking areas and habitat for the Timber Rattlesnake and the Allegheny Woodrat may need to be created in disturbed areas as deemed appropriate by District Forester.

**6.6** For timber rattlesnakes, the available rocks will be piled south-facing in the disturbed area. In order to create basking habitat, the rocks should be placed in piles, with large flat rocks laid horizontally. The crevices created will allow the snakes to thermoregulate, or to retreat if threatened. Conifers should not be planted near these created basking areas to avoid shading the rocks.

**6.7** Additionally, rocks stockpiled during excavation may be piled to create crevices for the Allegheny Woodrat at the direction of District Forester. Some conifers may be planted near the created Woodrat habitat, but deciduous, mast-producing trees such as chestnut oak are more desirable.

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF  
CONSERVATION AND NATURAL RESOURCES**

**EXHIBIT "E"**

**SURFACE USE AGREEMENT ACCESS ROAD SPECIFICATIONS FOR STATE  
FOREST LANDS**

**1. Road Definitions and Specifications**

**1.01** Operator recognizes that all roads owned or maintained by Department, which are used in the execution of this Surface Use Agreement, were constructed and improved for the use of Department and for the general public having business in and making use of State Forest land. Operator, therefore, agrees that its operations will not be conducted in such a manner as to prevent, hinder, or obstruct the customary use of such roads by Department or by the public.

**1.02** Roads necessary to develop an oil and/or gas well site shall be classified as Surface Use Agreement access roads. These roads are for primary access to oil and/or gas well sites.

**1.03** Operator shall not construct or improve any roads or clear any drilling sites, without prior approval from District Forester, who shall set forth the type and grade of roads and area to be cleared. Access roads shall be held to a maximum grade of ten percent (10%). However, if steeper grades are necessary, written approval must be obtained from District Forester prior to their construction.

**2. Location**

**2.01** Surface Use Agreement access roads, including all installations which Operator shall complete at his expense prior to the start of drilling operations, shall be located and designated on the ground by District Forester, and on a Topographic Map, scale 1 inch = 2,000 feet or any road construction map, of larger scale, which Operator has provided. A copy of said map must be provided to District Forester prior to construction.

**2.02** Where possible, the Surface Use Agreement access road locations will follow existing roads, existing or former disturbances and/or existing or former corridors including, but not limited to, old abandoned roads or pipeline rights-of-way. In such instances, these roads shall be improved and maintained to conform with the specifications for the location, construction, and maintenance of Surface Use Agreement access roads.

**2.03** When the Surface Use Agreement access road is to be located in an area where no road exists and access to the road and drill site will open onto a state or township highway, Operator shall obtain the necessary permits and approval from the Pennsylvania Department of

Transportation or township for said opening. On all Surface Use Agreement tracts where the road opens onto a paved state or township highway, Operator shall take extra precaution to prevent mud and debris from being carried onto the paved highway especially during periods of heavy road use. In areas where a mud problem may be present, Operator shall stabilize the paved road junction with native stone or washed gravel.

2.04 The District Forester must be notified five (5) working days prior to start of any road construction, improvement or maintenance so that the District Forester can make arrangements to be available when actual work begins in order to correct any misunderstanding regarding the road location or road work.

### 3. Clearing

3.01 Clearing for Surface Use Agreement access roads shall be wide enough to allow the construction of a road having a minimum width of eighteen (18) feet including ditches (a 16-foot running surface). Where turnouts are required, additional width shall be cleared as designated by District Forester (see Sketch A). The right-of-way disturbance width shall be a minimum of thirty-five (35) feet wide to allow prior drying action by the wind and sun.

3.02 Trees in the right-of-way must be cut and removed from cleared right-of-way. All stumps, roots, slash, and other debris must be disposed of as designated by the District Forester.

### 4. Grading

4.01 The Surface Use Agreement access road shall be either in-sloped, out-sloped, or crowned as specified by District Forester (see Sketch B). Ditches must be constructed on all roads except where they cross rock formations.

4.02 Cut slopes may be as steep as the soil formation or material will allow, as determined by District Forester during construction. Undercutting of slopes is prohibited. All cut slopes will be mulched and seeded as specified in Operator's Erosion and Sedimentation Plan to stabilize the cut slope as soon as possible after disturbance unless this requirement is waived by District Forester.

4.03 As needed, Operator may use without charge road shale and/or borrow materials from State Forest land. Extracting such material shall be restricted to locations designated by District Forester. All disturbed areas shall be restored to the satisfaction of the District Forester and treated with lime, fertilizer, and planted with seed as outlined in Operator's Erosion and Sedimentation Plan.

### 5. Drainage

5.01 Underground culverts (metal or plastic) and intercepting dips (see Sketch C) of sizes and types specified by District Forester shall be installed or constructed by Operator at locations designated on the ground by District Forester.

5.02 When any cross drainage or intercepting dip is within 100 feet of a stream crossing on a general watershed or within 200 feet of a stream crossing on a public or domestic watershed, Operator shall install a sump at the discharge end to receive water before it is discharged into the forest.

5.03 Operator shall break the berm on the outside of the road at strategic locations to allow drainage of the road surface. Such breaks may be made with a bulldozer and shall be located by District Forester. As a guiding rule these breaks shall be located a maximum of 50 feet apart.

5.04 If soil erosion takes place at the discharge end of culverts, intercepting dips, water bars, or breaks in the berms, a floor of hand-placed rock shall be provided. At discharge ends, tail ditches will be of sufficient length and depth to insure that drainage does not back up to road surface.

5.05 Sections of Surface Use Agreement access roads located in poorly drained areas must be built up with suitable material above natural grade with suitable material approved by District Forester. Synthetic road fabric must be used in these situations.

## **6. Bridges, Culverts, and Fords**

6.01 Bridges, as specified by District Forester and permitted and approved by the Department of Environmental Protection's Bureau of Dams, Waterways and Wetlands, must be installed where roads cross intermittent or permanent stream channels in accordance with the provisions of the Encroachment Permit. Any bridge design must be approved by the Department prior to construction. Department approval is not to exceed forty-five (45) days from the date of submittal of said design. In the event the Department does not respond within the allotted time frame, the design shall be deemed "approved".

6.02 Culverts, as specified by District Forester and approved by the Department of Environmental Protection's Bureau of Dams, Waterways and Wetlands, shall be placed in the bottom of the stream channel and covered with appropriate fill material. All culverts shall be installed in accordance with the provisions of the Encroachment Permit.

6.03 Fords, as permitted and approved by District Forester and approved by the Division of State Forest Management, the Pennsylvania Fish and Boat Commission's local Waterways Patrolman and the Department of Environmental Protection's Bureau of Dams, Waterways and Wetlands, are permissible only when it is not feasible to install a bridge or culvert. Fords are prohibited on all trout streams and on the watersheds of municipalities, institutions and private users. Fords must have solid bottoms and approaches that contain rock, stone or gravel. Fords must always be located at right angles to the stream channel. DRAGGING MATERIAL ACROSS FORDS IS PROHIBITED. Stream banks must be stabilized with stone to prohibit sedimentation.

**7. Maintenance**

7.01 Drainage structures shall be kept open and functioning at all times.

7.02 Gravel or shale shall be spread on intercepting dips that become subject to erosion.

7.03 Road surfaces shall be maintained so as to allow water to be drained from the roadway.

7.04 Loose boulders and slide material shall be removed from roadway and side ditches.

**8. Retirement and Abandonment**

8.01 Surface of roads shall be graded to eliminate any wheel ruts. Fenders and high outside shoulders shall be removed.

8.02 All bridges, drain pipes, and culvert pipes installed by Operator shall be removed at Operator's expense when no longer needed unless Operator is notified otherwise by the District Forester.

8.03 When culverts are removed, they shall be replaced by earth or log water bars (see Sketch E).

8.04 All drainage ways shall be opened and deepened so as to handle storm waters. Seeding to a grade cover for an immediate erosion control shall be completed as required herein.

8.05 Additional water bars shall be installed if required by District Forester.

8.06 The above-listed provisions shall be carried out as each Surface Use Agreement access road or portions thereof are abandoned rather than waiting until all development operations have been completed. If well is temporarily abandoned awaiting completion operations (i.e., fracturing, acidizing, perforating, drilling deeper), the road should be retired in a manner and at a time as specified by the District Forester.

**9. Gates**

9.01 All Surface Use Agreement access roads must be gated with an approved type of gate (see Sketch F). Authorized gates must be installed during Surface Use Agreement operations, and remain after Surface Use Agreement termination. District Forester shall be consulted as to location and time of construction of all gates.

**10. Highway Occupancy Permits**

10.01 All terms, conditions, and specifications of such permits applicable to this Surface Use Agreement shall be followed.

**11. Seeding**

11.01 All roads on the Surface Use Agreement are to be limed, fertilized, and seeded to a grass cover as per the requirements of this Surface Use Agreement as outlined in Operator's Erosion and Sedimentation Plan.

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF  
CONSERVATION AND NATURAL RESOURCES**

**EXHIBIT "F"**

**NONDISCRIMINATION/SEXUAL HARASSMENT CLAUSE**

During the term of the Contract, the Contractor agrees as follows:

- a. In the hiring of any employees for the manufacture of supplies, performance of work, or any other activity required under the Contract or any subcontract, the Contractor, subcontractor or any person acting on behalf of the Contractor or subcontractor shall not by reason of gender, race, creed, or color discriminate against any citizen of this Commonwealth who is qualified and available to perform the work to which the employment relates.
- b. Neither the Contractor nor any subcontractor nor any person on their behalf shall in any manner discriminate against or intimidate any employee involved in the manufacture of supplies, the performance of work or any other activity required under the Contract on account of gender, race, creed, or color.
- c. The Contractor and any subcontractors shall establish and maintain a written sexual harassment policy and shall inform their employees of the policy. The policy must contain a notice that sexual harassment will not be tolerated and employees who practice it will be disciplined.
- d. The Contractor shall not discriminate by reason of gender, race, creed, or color against any subcontractor or supplier who is qualified to perform the work to which the contract relates.
- e. The Contractor and each subcontractor shall furnish all necessary employment documents and records to and permit access to its books, records, and accounts by the contracting officer and the Department of General Services' Bureau of Contract Administration and Business Development for purposes of investigation to ascertain compliance with the provisions of this Nondiscrimination/Sexual Harassment Clause. If the Contractor or any subcontractor does not possess documents or records reflecting the necessary information requested, it shall furnish such information on reporting forms supplied by the contracting officer or the Bureau of Contract Administration and Business Development.
- f. The Contractor shall include the provisions of this Nondiscrimination/Sexual Harassment Clause in every subcontract so that such provisions will be binding upon each subcontractor.
- g. The Commonwealth may seek termination of the Contract as a remedy, and all money due or to become due under the Contract may be forfeited for a violation of the terms and conditions of this Nondiscrimination/Sexual Harassment Clause. In addition, the agency may proceed with debarment or suspension and may place the Contractor in the Contractor Responsibility File.



## ANADARKO PETROLEUM CORPORATION

# Loyalsock State Forest Plan of Development

*March 28<sup>th</sup>, 2012*



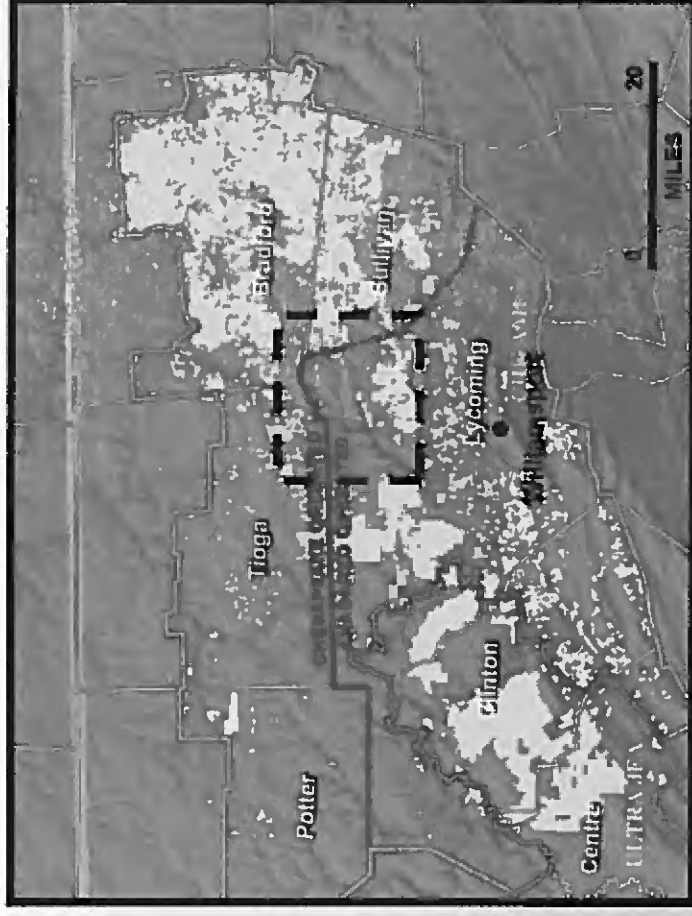
## Agenda

- **Loyalsock State Forest Plan of Development**
  - **Background**
  - **Regional Geology / Geophysics**
  - **Surface Disturbance**
  - **Plan of Development Map**
- **Financial Compensation**
- **Path Forward**



# Plan of Development : Background

- Approximately 25,000 Gross Acres
- Vast Resource Area with Positive Long Term Economic Impact to the Commonwealth
- Anadarko Plans to Operate within Loyalsock State Forest
  - Bring Economic Growth and Revenue to the Commonwealth and the State Forest
  - Minimize Surface Footprint
  - Limit Impact to Recreational Enjoyment





## Plan of Development : Background

- April, 2011 - 98 Potential Pad Locations were Submitted to DCNR as Part of Trade Negotiations
- Preliminary Surveillance of Loyalsock State Forest Performed in Q4 2011
  - Pad Locations, Roads, Pipelines, Compressor Stations, [REDACTED]
- Anadarko has Reduced the Pad Count by 74% by Avoiding:
  - Forest Regeneration Areas
  - Viewsheds
  - Scenic vistas
  - Other Recreational or Environmentally Sensitive Areas

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## Plan of Development : Minimize Footprint





# Loyalsock State Forest Plan of Development Map





# Plan of Development : Surface Disturbance

## Multi-Discipline Preliminary Evaluation of Surface Disturbance

- Pads
- Roads
- Midstream
- Water
- Communications
- Surface Disturbance Area



Facility	Average Size	Count	Total Acreage
Well Pad			
Compressor Stations			
Impoundments			
New Roads			
Pipellnes (adjacent)			
Pipelinees (cross-country)			



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## Plan of Development : PA Economic Benefit



- **Anadarko proposes a different financial compensation plan to the DCNR**
  - DCNR receives near term revenue
  - Anadarko can economically develop the acreage within Loyalsock State Forest



## Plan of Development : PA Economic Benefit

Anadarko offers the following counter proposal for the Loyalsock State Forest Development:

### DCNR

- Surface Consideration Payment **\$15,000,000**



### Commonwealth



*\*Values are estimated over the life of the project, at \$3.25/mmbtu natural gas price*

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## Plan of Development : PA Economic Benefit

Payments are based on APC's current forecast schedule:

### • 2012

- \$3,750,000 – 25% of Surface Consideration Payment

- *Payment within 30 days of Surface Use Agreement Approval/Execution*

(assumes end of Q3, 2012)

### • 2013

- \$3,750,000 – 25% of Surface Consideration Payment

- *Payment within 30 days of beginning of Infrastructure Construction*

**\$3,750,000** (assumes Q2, 2013)

### • 2014

- \$7,500,000 – 50% of Surface Consideration Payment

- *Payment within 30 days of first sales from a well within Loyalsock State Forest*

**\$7,500,000** (assumes Q4, 2014)

### • 2014 - Forward

- Commonwealth : Impact Fee Revenue

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## Path Forward

### ● DCNR

- Review Loyalsock State Forest Plan of Development Documentation
  - *Plan of Development Map / Narrative*
  - *State Forest Environmental Review*
  - *Surface Use Agreement*

### ● Anadarko

- Available for future discussions/consultations regarding Development Plan & Surface Use Agreement
- Begin Field Survey Work and Permitting Process by May 1, 2012

### ● Both Parties : Reach Development Plan & Surface Use Agreement Execution by Q4 2012





# Loyalsock State Forest Plan of Development Map

